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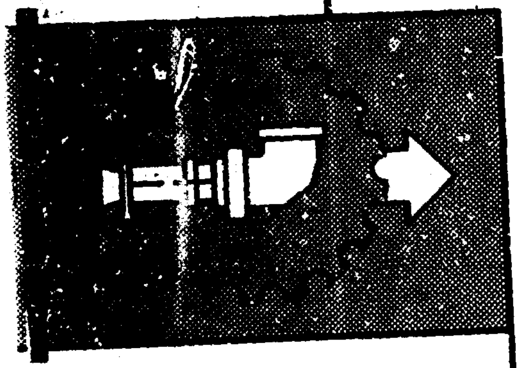
AD867078

LM1500 ENGINE
MARINIZATION CONTRACT
PHASE I ENGINE TEST
RESULTS

31 December 1963



MARINE AND
INDUSTRIAL
GAS TURBINES

Prepared for: Navy Department
Bureau of Ships

Contract No: NObs-88423

Project Serial No: SS501-000, Task 3900

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Marine and Industrial Operation

GENERAL ELECTRIC

CINCINNATI 15, OHIO

ENCL. (2) TO NAVSHIPS LTR SER-T40

237

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F O R W A R D

This report has been prepared and is submitted in compliance with the requirements of Bureau of Ships Contract NObs-88423, Project Serial Number SS501-000, Task 3900 and contains the results of the Phase I, LM1500 engine test and inspection for thirty (30) hours operation using poor quality marine diesel fuel per MIL-F-16884D.

Phase I of this contract also requires reports on the results of an engine fuel system bench test using sea water contaminated fuel and a laboratory study of the corrosion resistance of various engine materials and coatings. These reports will be submitted separately.

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1.0 INTRODUCTION

1.1 Purpose of Test

In accordance with BuShips Contract NObs 88423, a production line J79-8 engine, less afterburner and anti-ice control, was operated with a fixed area conical nozzle to simulate LM1500 power turbine to determine effect of burning poor quality diesel fuel per MIL-F-16884D. The effect of burning diesel on engine performance, combustion liner temperatures, turbine inlet temperature profile and first stage turbine nozzle metal temperatures was determined for a thirty hour endurance run.

1.2 Test Conclusions

Engine hot section teardown and inspection at the conclusion of the diesel operation showed moderate to heavy deposition on the fuel nozzle faces; crusty deposition on the combustion liner which may effect liner life if it continues to build up on the liner louvers; and a moderate deposition on the first stage turbine nozzle partitions and blades. There was little or no deposition on the second and third stage turbine nozzles and blades.

Engine operational characteristics showed no effect due to burning diesel fuel. Likewise, there was no measurable change in engine performance.

Combustion liner skin temperatures were higher by as much as 50°F for diesel operation as compared with JP-5 operation. There was no change in turbine inlet temperature profile due to burning diesel fuel. The first stage turbine nozzle metal temperatures were lower during diesel operation than during JP-5 operation. Vane leading edge temperatures were an average of 30°F lower and vane trailing edge temperatures were an average of 15°F lower.

A start test using a special diesel fuel - lube oil mixture with a viscosity of 28 centistokes at a mixture temperature of 26°F demonstrated successful engine light off and acceleration to idle speed in 136 sec.

1.3 Nomenclature

Fg	Gross Thrust	Lbs
K	Indicates corrected Parameter	-
N	Engine Speed	RPM
P_{G2}, P_{G3}, P_{G4}	Turbine nozzle and turbine cooling flow pressure	PSIA
P_{t2}	Compressor inlet total pressure	PSIA
P_{t5}	Turbine discharge total pressure	PSIA
P_{t7}	Exhaust nozzle entrance total pressure	PSIA
SFC	Specific fuel consumption	Lb/HP-Hr

1.3 Nomenclature (cont'd)

T_{G2}, T_{G3}, T_{G4}	Turbine nozzle and turbine cooling flow temp.	°F
T_{S2}	Partition leading edge temp.	°F
T_{S8}	Partition trailing edge temp.	°F
T_{t2}	Compressor inlet total temp.	°F
T_{t3}	Compressor discharge total temp.	°F, °R
T_{t4}	Combustion discharge total temp.	°F
T_{t5}	Turbine discharge total temp.	°F
W_a	Engine Air Flow	Lb/Sec
W_f	Engine Fuel Flow	Lb/Hr

Subscripts

a	Airflow
f	Fuel Flow
g	Gross
i	Measured Parameter
x	Calculated parameter

Correction Factors (.K)

In each of the corrected parameters, except pressures, humidity is included but the symbol is deleted. Humidity corrections for pressures are not applicable.

2.0 TEST

2.1 Description of Engine

The engine tested was a J79-8 model engine, procured from the production line at General Electric, Evendale, Ohio, following its initial acceptance (green) run. This engine, S/N 421-326, was retrofitted as follows:

1. The controls, accessories and piping items required only for afterburning operation were removed. The production type J79-8 main fuel control and related accessories were retained.

2. The anti-icing system was removed.

3. The inlet, transfer, rear and horizontal drive gearboxes were replaced with assemblies incorporating aluminum casings. The duplex bearings in both the inlet and transfer gearboxes were reversed to allow operation with a pneumatic starter installed on the forward face of the transfer gearbox.

4. The stage one turbine nozzle was replaced with a new part instrumented for the turbine inlet profile, partition, and nozzle band temperature measurements.

5. The combustion and ignition liners were replaced with rigid mount type liners. One combustion liner and the ignition liner were instrumented for the skin temperature level measurement.

6. The outer combustion casing was replaced with a part modified with bosses for instrumentation leadout purposes.

7. The main sparkplug was replaced with a part compatible with the rigid mount type ignition liner.

8. The compressor rear frame was replaced with one modified for mounting compressor discharge total pressure and temperature rakes required for the turbine inlet temperature tests.

9. One of the ten P/N 577C796P5 fuel nozzles was replaced with a P6 type part. The P/N 577C796P6 type fuel nozzle has demonstrated a more consistent light off capability and was installed in the ignition liner for the start test.

10. The afterburner was replaced with a slave tailcone - tailpipe - fixed area conical exhaust nozzle system. Reference Figure 2.1-1 taken in the test cell during setup.

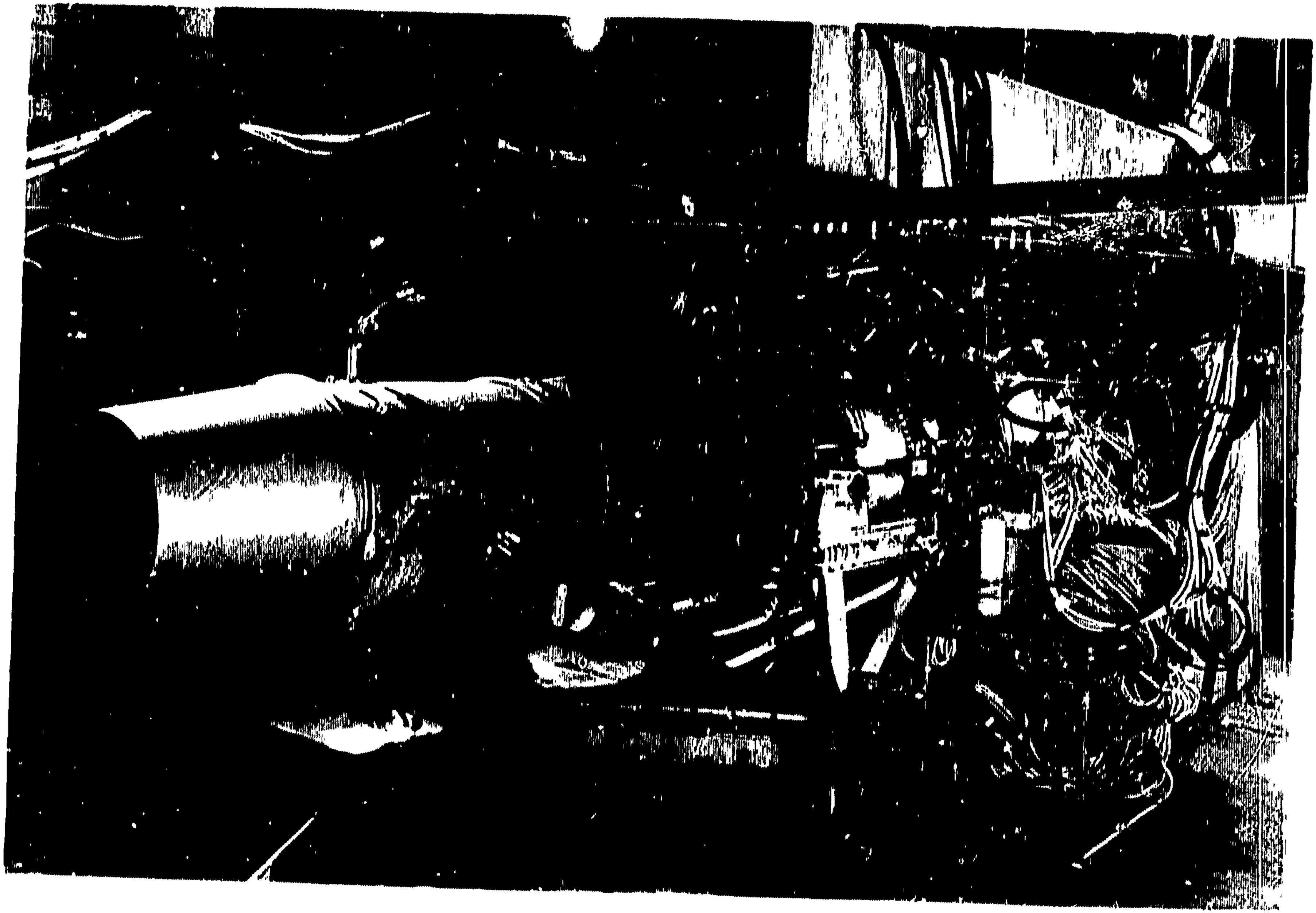


FIG. 2.1-1

30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

277091

2.1 Description of Engine (cont'd)

The fixed area conical exhaust nozzle simulated a DN1500 power turbine. The conical nozzle was sized to simulate operation of the AGEE power turbine at turbine inlet temperature levels consistent with the configuration as specified for the AGEE requirements with the following assumptions:

1. Inlet pressure loss = 4" of water
2. Exit pressure loss = 6" of water
3. Ambient pressure = 29.92" of mercury
4. Ambient temperature = 100°F
5. 100% relative humidity
6. Power turbine speed = 4950 RPM at 14000 SHP (normal rated speed for the DN1500 is 5500 RPM)
7. Power derated 5% below the average level

The conic nozzle hot effective area for the above assumptions was calculated to be 315 in^2.

The specified temperature levels for a hot effective conic nozzle area of 315 in^2 were:

SHP	T_4 Calculated-°F	$T_{5.1}$ Calculated-°F
14000	1728	1130
11000	1606	1036
7000	1446	910

During the Phase II testing the specified temperature level will be approximately 60°F lower at the 14000 HP point due to the following changes in assumptions:

1. Power Turbine speed = 5500 RPM at 14000 HP consistent with the PGM engine.
2. 100% relative humidity.
3. Power margin of 2.0% to represent the levels actually demonstrated by this engine.
4. Hot effective conic nozzle area optimized to be consistent with the foregoing assumptions (approximately 333 in^2).

The modified engine was defined by B/U Parts List #F65-211-0000-138; B/U #1 for engine S/N 421-326.

2.2 Test Facilities

The testing was conducted at the General Electric ground test facility located in Evendale, Ohio, Building 500, Test Cell 27.

The engine was mounted in a steel test dolly and supported by two trunnion pins at the turbine frame horizontal uniball mounts and one pin thru the forward frame top center mount. The dolly was jacked up off the floor and supported on the movable linkage section of the cell thrust frame by four pneumatically operated thrust pins. All instrumentation lines to the engine were flexible and the thrust frame was completely unrestricted along the line of thrust. The movable section of the thrust frame was connected to a thrust strain gage load cell which transmits the force of engine thrust to a direct reading electronic thrust indicator.

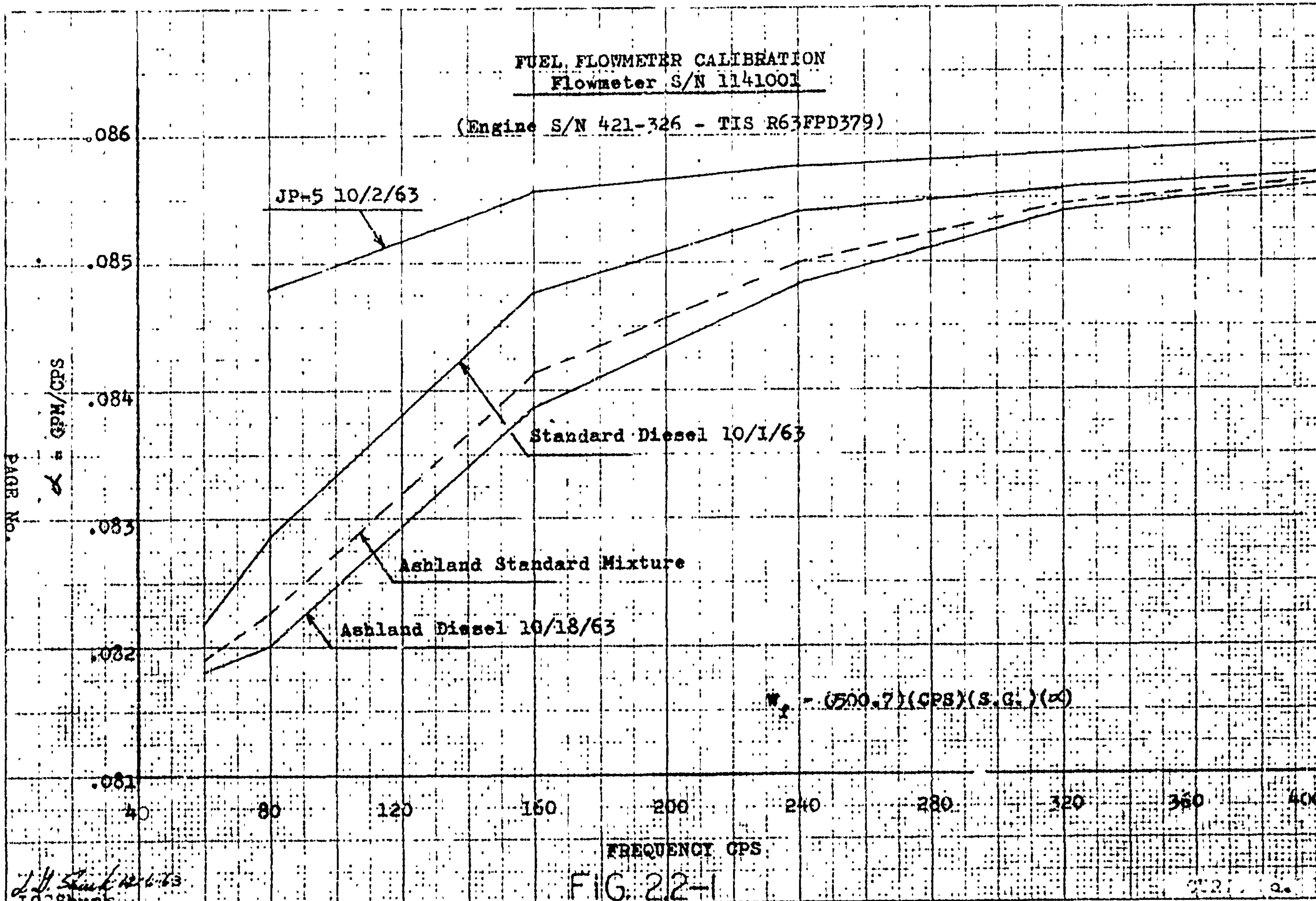
The fuel at the engine inlet was maintained at 10-30 psig pressure by an air loaded regulating valve.

Engine fuel flow rate was measured with a turbine impeller type flow sensor installed in the inlet line upstream of all engine components. A second sensor was installed in series with the first sensor for verification purposes. These meters (referred to as flowmeters) have a calibrated accuracy of ± ½%. Refer to Figure 2.2-1.

2.3 Instrumentation

Engine safety instrumentation measuring engine vibration, lube oil temperatures and speed was standard factory engine test instrumentation. The performance instrumentation used was as listed below:

Parameter	Symbol
Airflow Rake	P_{S2}, P_{t2}
Compressor Inlet Temperature	T_{t2}
Compressor Discharge Temperature	T_{t3}
Compressor Discharge Total Pressure	P_{t3}
Turbine Discharge Total Pressure	P_{t5}
Turbine Discharge Total Temperature	T_{t5}
Nozzle Entrance Total Pressure	P_{t7}
Fuel Flow	W_f
Thrust	F_g


FUEL FLOWMETER CALIBRATION
Flowmeter S/N 1141001
(Engine S/N 421-326 - TIS R63FPD379)
JP-5 10/2/63
Standard Diesel 10/1/63
Ashland Standard Mixture
Ashland Diesel 10/18/63
W_f = (500.7)(CPS)(S.G.)(α)
α = GPM/CPS
.086
.085
.084
.083
.082
.081
40
80
120
160
200
240
280
320
360
400
FREQUENCY CPS
PAGE No.
L.G. Shuck 12-6-63
LG Shuck
FIG. 22-1

Combustion liners #4 and #10 were instrumented to measure liner skin temperatures. Thermocouple location on each liner is shown on Figures 2.3-1 and 2.3-2. The numbers on these figures indicate liner locations and are as follows:

1. Inner liner foreward
2. Inner liner midregion
3. Side of cross fire eyelet foreward of shear slot
4. Side of cross fire eyelet aft of shear slot
5. Behind crossfire eyelet
6. Z-Ring behind crossfire eyelet
7. Z-Ring between crossfire eyelet
8. Rear liner

Temperatures of the stage 1 turbine nozzle were measured by placing thermocouples at various locations.

Vane leading edge temperatures were measured by placing thermocouples at the leading edge pitch of vanes 7, 8, 19, 20, 31, 32, 42, 54, and 55.

A false front was installed on the leading edge of thirty of the fifty-eight vanes in the nozzle. Five thermocouples were mounted in each false front so that they were equally spaced radially front root to tip. Six vanes behind each of the five odd numbered combustion cans were so instrumented to detect the radial and circumferential temperature profiles of the gas stream.

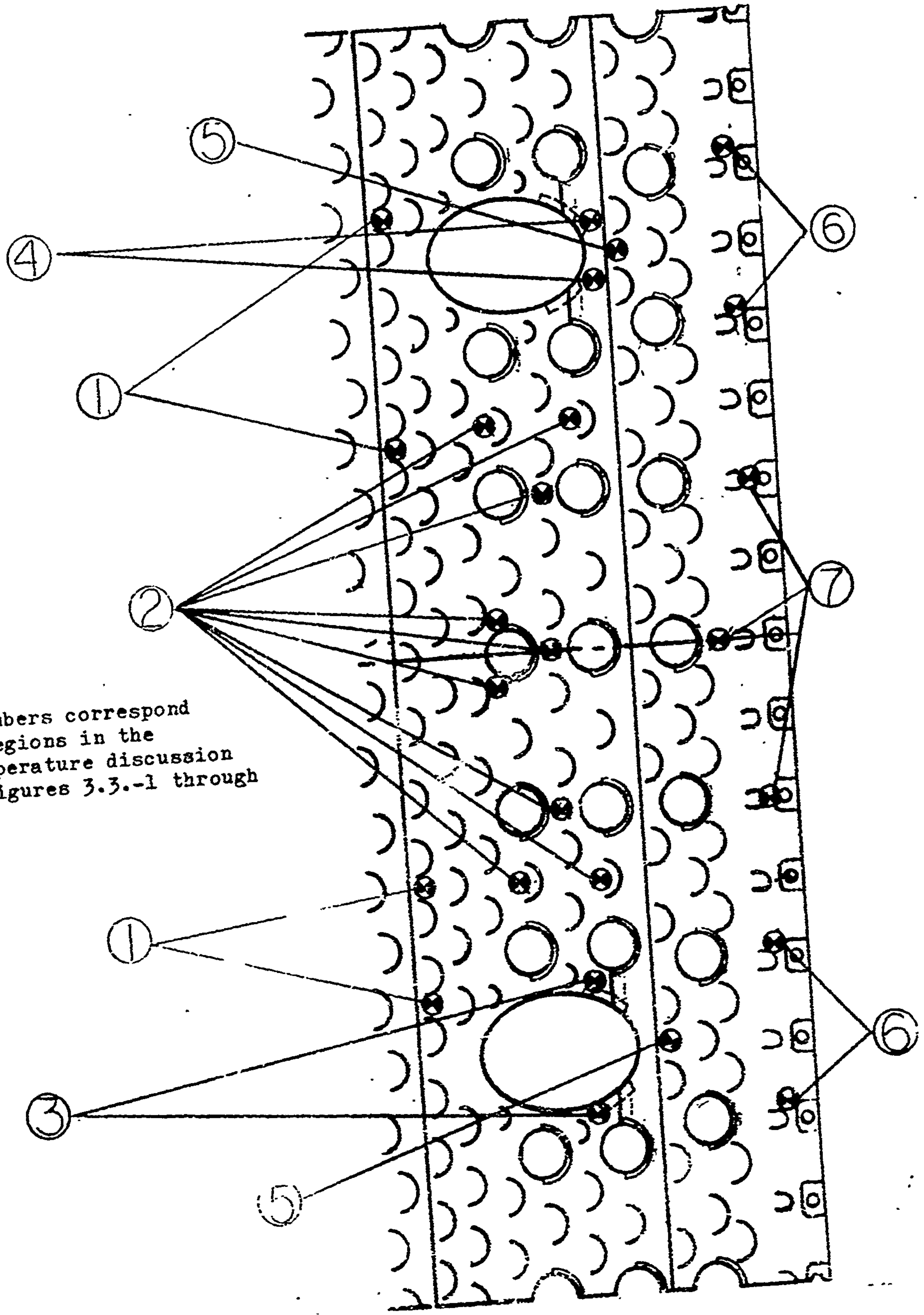
Vane trailing edge temperatures were measured by placing thermocouples on the convex side pitch just forward of the trailing edge. Vane 1, 2, 7, 8, 13, 14, 19, 20, 31, 32, 42, 43, 55 were instrumented in this manner. Note that vanes 1, 2, 13, and 14 were vanes having false fronts whereas the reamainder were not. This was an attempt at correlating T_4 gas temperatures with vane skin temperatures to check vane cooling effectiveness.

Inner band skin temperatures were measured by placing thermocouples on the inner band at the trailing edges of vanes 7, 8, 19, 20, 31, 32, 42, 54, and 55. Thermocouples were also placed on the inner band between vanes. In the throat at the D_o line they were located between vanes 7-8, 19-20, 31-32, 42-43, and 54-55. At the trailing edge line, they were located between vanes 1-2, 7-8, 13-14, 19-20, 31-32, 42-43, and 54-55. The thermocouples located between vanes 1-2, and 13-14 were an attempt at correlating T_4 gas temperatures with inner band skin temperatures to check cooling effectiveness.

Cavity cooling air temperatures were measured by placing thermocouples in the outer manifold between the outer band and the casing, in the inner manifold between the inner band and the baffles, and in the wheel space cavity between the stage 1 turbine nozzle and the stage 1 bucket shank. These thermocouples were placed between vanes 2-3 and 31-32.

FIGURE 2.3-1

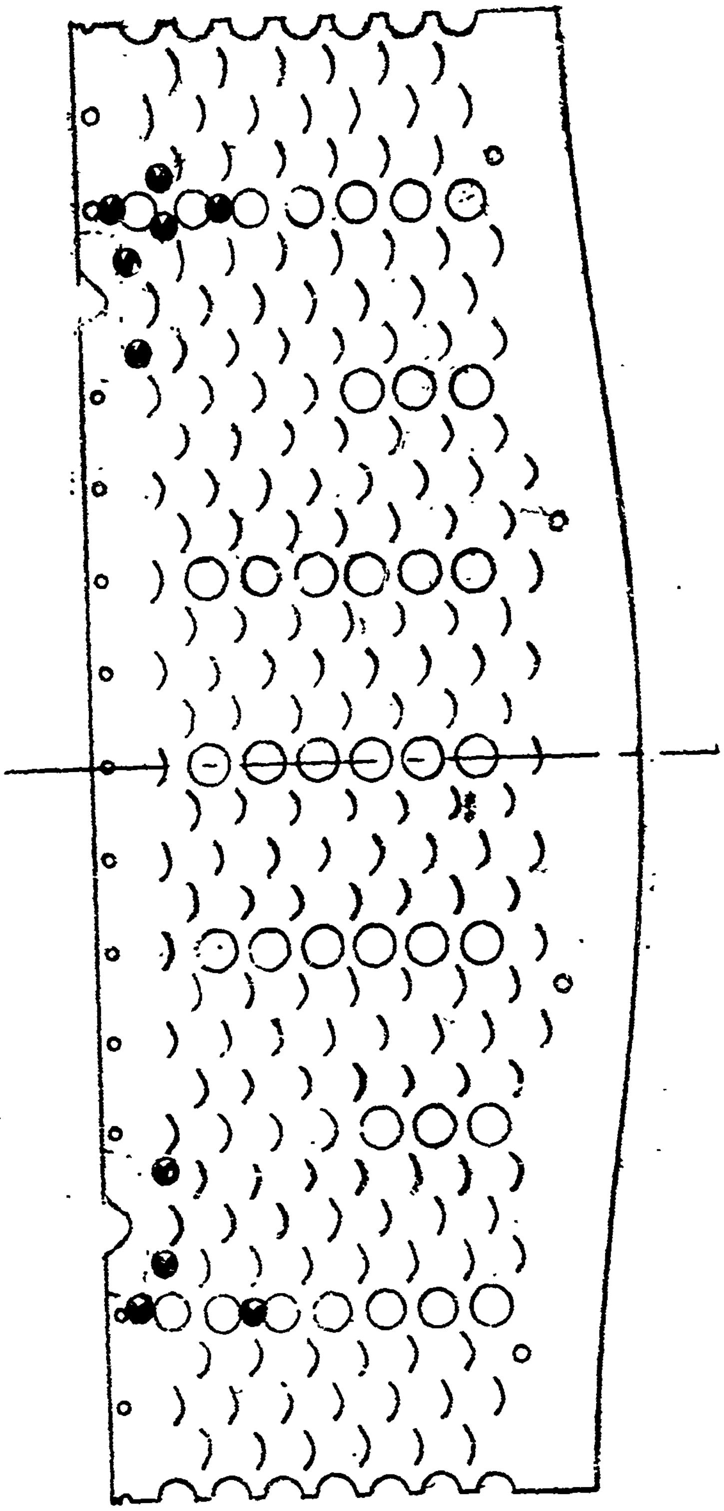
INNER COMBUSTION LINER



These numbers correspond to the regions in the skin temperature discussion and to figures 3.3.-1 through 3.3.-7.

COMBUSTION LINER - REAR

FIGURE 2.[illegible] - 2



These thermocouples are for region 8 in the skin temperature discussion and Figure 3.3-8.

The stage 1 turbine nozzle was reworked according to Figures 2.3-3 and 2.3-4 to incorporate the above thermocouples.

All liner and diaphragm temperatures were readout on an automatic millivolt recorder. This recorder has a 300 channel capacity and will record all 300 channels in approximately 60 to 80 seconds. Data were printed out on two paper tapes. One has numerical results in millivolts printed out and the other is a coded punched tape and is compatible with the computer key punch machine used. Use of this recorder when computers are required is a definate cost reduction. The exact location of the turbine nozzle instrumentation is readily obtainable from Figure 2.3-4. The coding is explained at zone H-4. The four numbers preceding the letters are vane numbers. This may be one or two vanes. Using column 1 row 9 from Table I, Section 4.2 the interpretation is as shown.

1920TB2

Vane 19 — Position 2 on Band

Vane 20 — Temperature of Band

The thermocouple is located on the interband between vanes 19 and 20. To briefly cover a few more: (Refer Sect. 4.2 Table I)

- 7TS2 - Vane 7 leading edge midpoint skin temperature
- 19TS8 - Vane 19 trailing edge midpoint skin temperature
- 2-3TG3 - Cooling airflow temperature on O.D. of outer band between vane 2 and 3.

2.4 Fuel Description

The JP-5 fuel used for the engine checkout and initial comparative turbine inlet profile test was per MIL-J-5624J. Analysis of the fuel by the General Electric Co. is presented in Figure 2.4-1.

The fuel for the diesel comparative turbine inlet temperature profile test and the endurance testing was a special batch of poor grade diesel fuel per MIL-F-16884D obtained from the Ashland Oil Company. The certificate of analysis for this fuel obtained from the Ashland Oil Company laboratory is presented in Figure 2.4-2 and confirmed by General Electric Co.

The fuel used for the start test was a special blend of the diesel fuel procured from Standard Oil Company with enough napthanic base lube oil, per MIL-L-15016, grade 2110 added to produce a viscosity of 5.0 - 6.1 centistokes at 100°F. Analysis of the Standard Oil Company diesel fuel is presented in Figure 2.4-3.

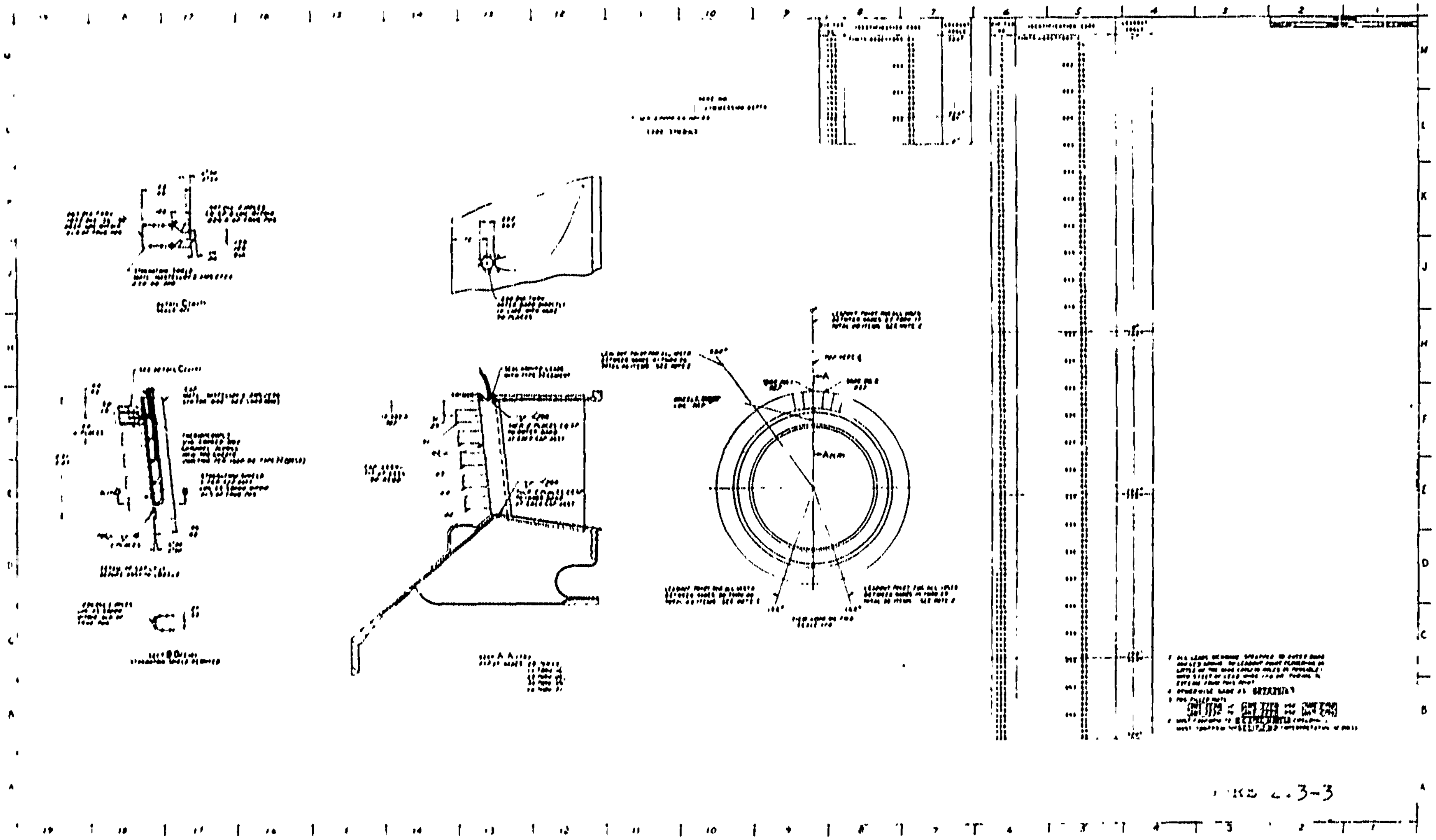


FIGURE 4.3-3

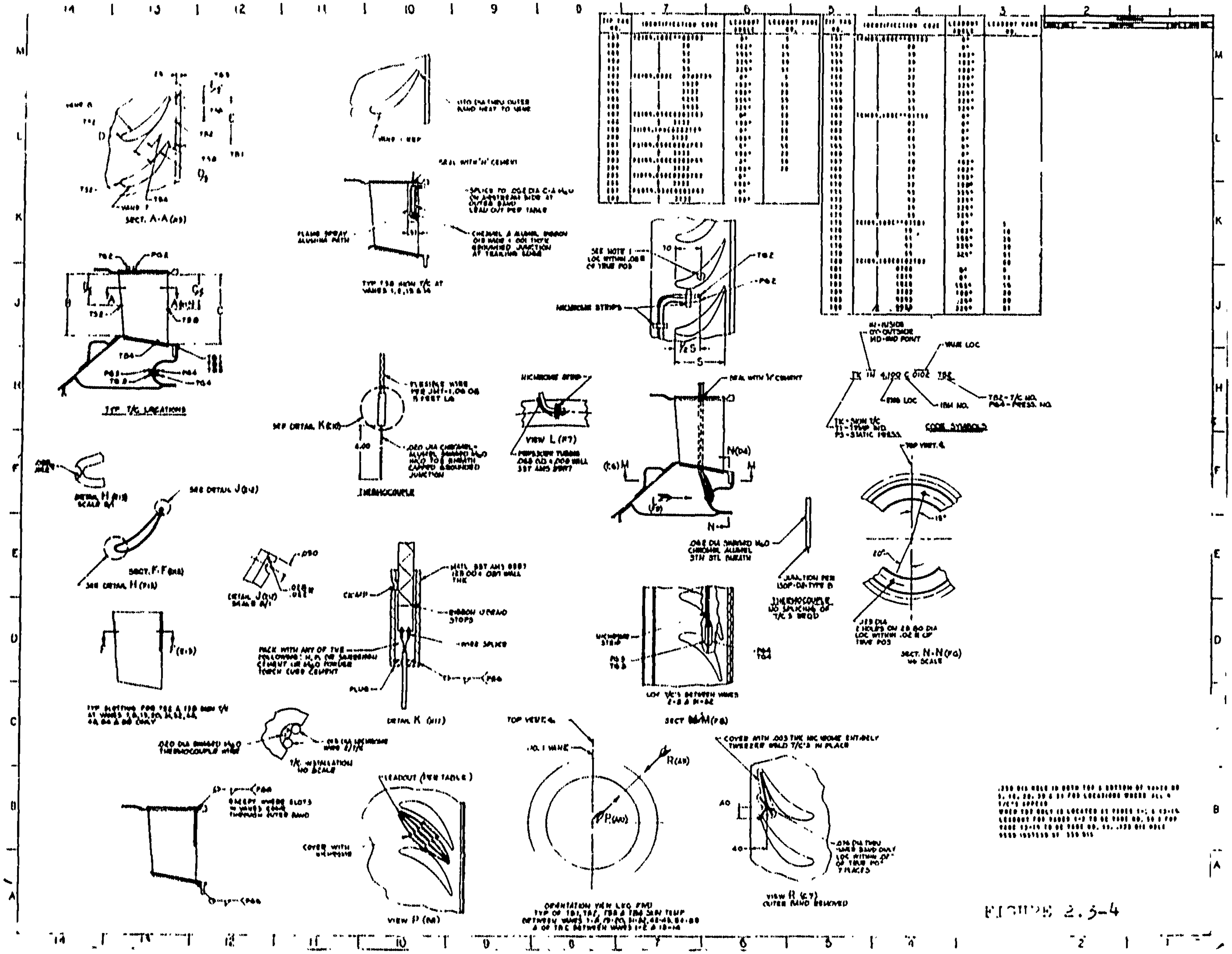

SECT. A-A
TYP. T/C LOCATIONS
THERMOCOUPLE
NICHROME STRIPS
VIEW L
CODE SYMBOLS
SECT. N-N
DETAIL K
SECT. M-M
VIEW P
VIEW R
OUTER BAND REMOVED
ORIENTATION VIEW LKG FWD

FIGURE 2.5-4

Figure 2.4-1

JP-5 FUEL ANALYSIS REPORT

For: Marinization Program

Ext: Mail Drop

Sample #: T-1118

Specification: JP-5

Sample Dated: 10-15-63

Sample Rec'd: 10-17-63

Specific Gr. @ ____ °F ____

Specific Gr. @ ____ °F ____

Specific Gr. @ 60 °F .8049

Aniline Point: 143.7

Aniline Gravity Product: 6366

Net Heat: 18,586 BTU/LB.

Distillation:

Initial Boiling Point 377 °F

10% Evaporated @ 390 °F

20% Evaporated @ 395 °F

50% Evaporated @ 409 °F

90% Evaporated @ 448 °F

End Point 500 °F

Residue 0.8 %

Loss 0.9 %

Thermal Stability @ ____ °F

Pressure Drop ____ in Hg

Preheater Rating ____

Date: 11-22-63

Engine Program: Marine Engine

Engine # S/N 421-326

Sample Ident: From Cell 27

Run #A - T_4 Test

Charge # ____

Viscosity @ ____ °F ____

Viscosity @ ____ °F ____

Viscosity @ 100 °F 1.43

Flash Point 147 °F

Freezing Point -68 °F

Smoke Point ____ min.

Smoke Vol. Index ____

Aromatics (by volume) 12.9 %

Olefines, (by volume) 2.3 %

Water Reaction ____

Solid Contaminants ____ mg/gal.
(0.80 micron filtration)

Water Content @ 75°F ____ ppm

Hydrogen/Carbon Ratio 0.161

Sulfur (by weight) .037 %

Anti-Icing Additive (by volume ____ %

Other % Hydrogen 13.90

Remarks ____

Figure 2.4-2

ASHLAND DIESEL OIL ANALYSIS

Company Making Analysis	Ashland	G.E.
Ignition Quality, Cetane	51	49
Distillation, °F		
IBP	368	370
10%	436	422
50%	512	520
90%	678.	678
E.P.	726	721
Res.	1	0.4
Flash Point, °F	175	169
Pour Point, °F	? -30-	
Cloud Point, °F	-0-	
Viscosity at 100°F		
Centistokes	4.36	4.48
Saybolt Seconds	40.30	
Carbon Residue, on 10% Res.	0.31	
Total Sulfur, W %	0.82	0.76-0.83*
Corrosion at 212°F	1a	
Ash - Wt. %	0.001	
Gravity, API	36.1	
Specific Gravity	0.8443	.8442
Acid Number	0.01	0.05
Neutrality	Neutral	
Carbon/Hydrogen Ratio		0.662
Net Heat, BTU/LB	18,312	18,360
Aromatics, V%	27	
Thermal Stability @ 225/325		
Preheater		0
Δ P, " Hg.		0

*Two different samples.

Figure 2.4-3

STANDARD OIL DIESEL ANALYSIS

This is a certificate of analysis of diesel fuel in conformance to MIL-F-16884D, plus the special stated requirements.

Aromatics	22.1
Sulphur	0.16
Carbon Residue	0.166
Corrosion	1A
Ash	0.009*
Viscosity at 100°F	2.76 Centistokes
Pour	-15 Fluid
Cloud	-14
Flash	170
Gravity	36.0
Distillation Range	
Initial	394
10%	448
50%	504
90%	562
EP	596
Cetane Index	49.5
Demulaibility	1 min. 25 seconds
Neutrality	Liquid is neutral
Residue	Pass
Acid No.	0.21
Carbon Hydrogen Ratio	
Carbon	86.32%
Hydrogen	13.4%

*Ash content shown was verbally accepted by D. Trankler of G.E.

2.5 Test Description

The test schedule consisted of the following:

1. Engine mechanical checkout using JP-5 type fuel.
2. Determination of turbine inlet temperature profile and pattern factor and combustion liner skin temperature levels while burning JP-5 type fuel.
3. Repeat of item 2 while burning poor grade diesel fuel.
4. Thirty hours of endurance testing using poor grade diesel fuel.
5. Cold start testing

The mechanical checkout consisted of a brief test to determine safety of engine operation, that performance instrumentation was consistant and accurate, and to determine the indicated exhaust gas temperature levels required for the calculated exhaust gas temperature test points. The calculated exhaust gas temperature is the theoretical temperature level based on fuel-air ratio while indicated temperature is that sensed by a single immersion type engine supplied thermocouple harness.

The test schedule to evaluate the combustion discharge profile and metal temperatures was selected to include the 14,000, 11,000, 7,000 HP setting and sufficient points between and above these settings to provide a good evaluation of this data and to provide turbine nozzle design and life background data. The setting selected for the equivalent horsepower was the temperature a minimum engine would experience on a 100°F day. These were as follows:

Calculated T_{5x} - °F	Equivalent HP	Approx. Speed RPM
910	7000	6900
1038	11000	7100
1079	-	7180
1116	-	7240
1130	14000	7280
1158	-	7330
1175	-	7415

The 1175°F T_5 point was not run with JP-5 fuel to prevent placing the life of the T_4 thermocouples in jeopardy prior to the diesel fuel testing.

During the endurance testing the power setting and sequence was as follows:

First Ten Hours

Power Setting - HP	T_{5i} - °F	Time At Point-Hours
11,000	1050	4.5
14,000	1160	1.0
7,000	920	4.5

Second Ten Hours

Power Setting - HP	T_{5i} - °F	Time At Point-Hours
14,000	1160	1.0
11,000	1050	4.5
7,000	920	4.5

Third Ten Hours

Power Setting - HP	T_{5i} - °F	Time At Point-Hours
14,000	1160	1.0
-	1105	0.25
11,000	1050	4.25
-	1000	0.25
-	960	0.25
7,000	920	4.0

These power levels were maintained by setting the indicated exhaust gas temperature level to that required to produce the proper caliculated temperature for each point. The indicated exhaust gas temperature listed for each point is that required to produce the stipulated horsepower levels based on the use of the installed 318.4 square inch conical exhaust nozzle.

At each point on the diesel and JP-5 fuel benchmark runs, the digital temperature recorder was cycled to obtain three consecutive readings of liner and diaphragm temperatures. On the first and second ten hour cycle readings were taken on the digital at the beginning and end of the 14,000, 11,000, and 7,000 HP point and were also taken during other three power settings. Refer to Section 4.1 and 4.2

Good quality data were obtained on the digital recorder on all points except during the first 10 hours. One acceptable reading was taken on this run and then a faulty thermocouple shifted the recorder (an erratic shift) and the data on the remaining points were not usable.

The internal surfaces of the ignition liner (position #4) and two combustion liners (positions 8 and 10) were inspected following each 10 hour endurance cycle with the aid of a borescope. The borescope was inserted into the combustion liner through the fuel nozzle ports and through the spark plug port in the ignition liner.

After completion of the 30 hour endurance test, a start test was completed to determine if the engine could be ignited, and if accelerations to idle speed could be obtained with diesel fuel that has a viscosity of 6.0 centistokes at 100°F, cooled to a minimum temperature of 25°F.

The method used to supply, the cooled fuel to the engine (fuel temperature measured at P & D value outlet) was as follows:

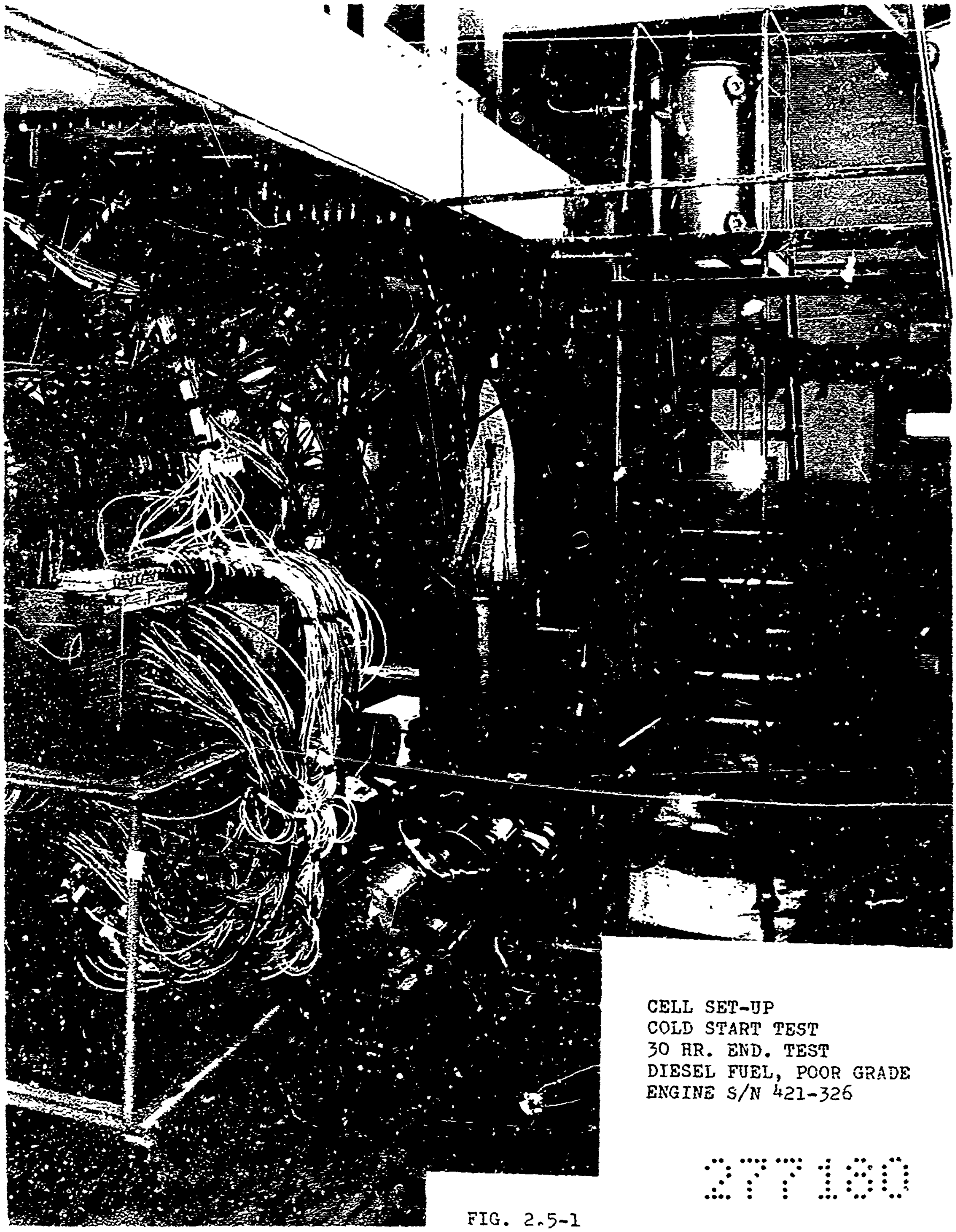
> The fuel lines between the main fuel control and the pressurizing and drain valve were connected into a slave system which incorporated check valves. The system contained sufficient hose to obtain the required volume for each start. This volume of fuel was circulated thru the heat exchangers until the desired temperature was obtained. After reaching the desired temperature, an engine start was made and the warm fuel from the supply drum pushed the cooled fuel into the combustors. Several modifications were made to the slave system to obtain the proper volume of cooled fuel.
>
> Figure 2.5-1 shows the test set-up. The tubes on the floor are the heat exchangers and the pumps shown in the photograph were those used to circulate the fuel and coolant through the heat exchangers. Figure 2.5-2 shows a schematic of the test set-up.

The start test was conducted beginning with the fuel at ambient temperature (approx. 75°F) and lowering the temperature in increments of approximately 10°F until the minimum objective of +25°F was reached. A series of two light offs with the start aborted after exhaust gas temperature began to rise. The one start to idle speed was completed at each test temperature level.

A special blend of diesel fuel (viscosity 6.0 centistokes at 100°F) was prepared for this test. The specific gravity adjustment on the production type main fuel control was adjusted to produce starting fuel flows near nominal for the 500 ± 50 PPH range required. This was re-adjusted for the minimum fuel temperature point (26°F) to 540 PPH to produce a successful start at that temperature.

The following running times were accumulated during this test:

	JP-5 Fuel	Diesel Fuel
TOTAL	: hours	33:10 hours
Endurance	-	30:00 hours
No. of Starts	4	36



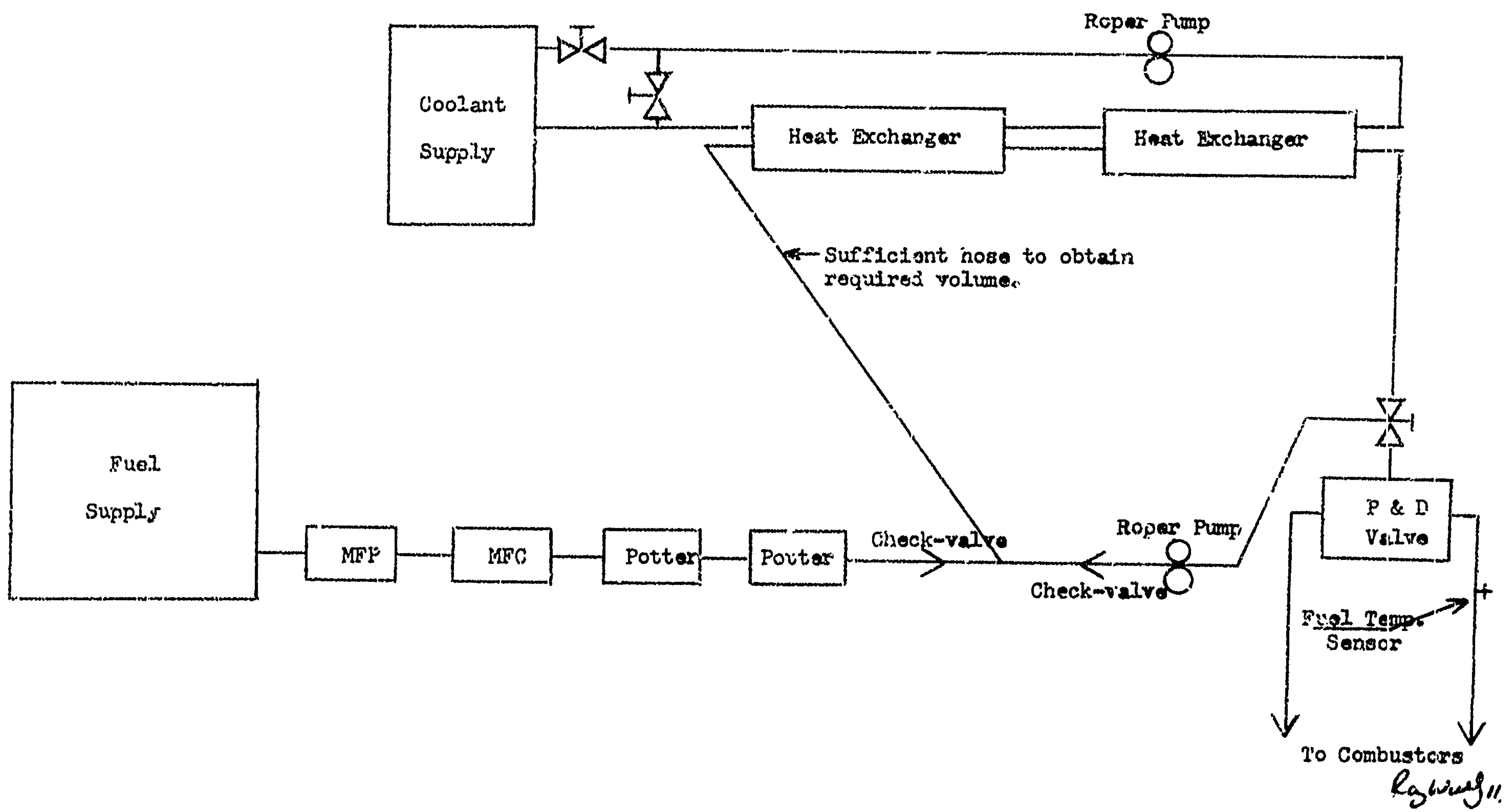
CELL SET-UP
COLD START TEST
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

277180

FIG. 2.5-1

Figure 2.5-2

COLD FUEL START TEST



3.0 TEST RESULTS

3.1 Engine Inspection

The turbine and combustion sections were disassembled following the test program to determine if the component parts which comprise the hot section portion of the engine would reveal any deleterious effects as a result of burning poor grade diesel fuel. The results noted during the post test visual and fluorescent penetrent inspections are presented as follows:

Combustion Liners & Ignition Liner

The ten liners were disassembled into their three major components (outer, inner and rear liners) for the post-test inspection. A disassembled liner is shown in Figure 3.1-1.

The internal surfaces of the inner liners including the thimble projections were generally covered with a slight deposit or build-up as shown in Figure 3.1-2. The deposit at the inner liner louvers was more intense and considered significant at these locations since the deposit was partially bridging the louver gapes and reducing the amount of cooling air. This would have an adverse effect on part life. This condition is shown in Figure 3.1-2 and -3. These reddish-black deposits ranged from an ash like deposit on the smooth surfaces, removable with the finger, to a hard, crusty-like substance generally noted at the louvers and on the thimble projections. This crusty-like substance was not removable with the finger nor was it removed during a post-test solvent wash and steam cleaning operation. After this wash operation, the visual inspection of the inner liners revealed all ten parts to be in excellent mechanical condition with no reported cracks. Reference post-cleaning Figure 3.1-4 and -5. The internal surfaces of the rear liners were generally free of the deposit except for two streaks along the bottom of each can. This build-up was the same crusty-like substance noted at the inner liner louvers. All louvers on the rear liners were free from the deposit or build-up. Conditions noted on the rear liners are shown in Figure 3.1-6. After the rear liners were washed the visual inspection revealed all parts as satisfactory mechanical condition with no cracking observed.

The outer liners were free from deposits and were in excellent post-test mechanical condition. The outer liners do not contact the combustible gases.

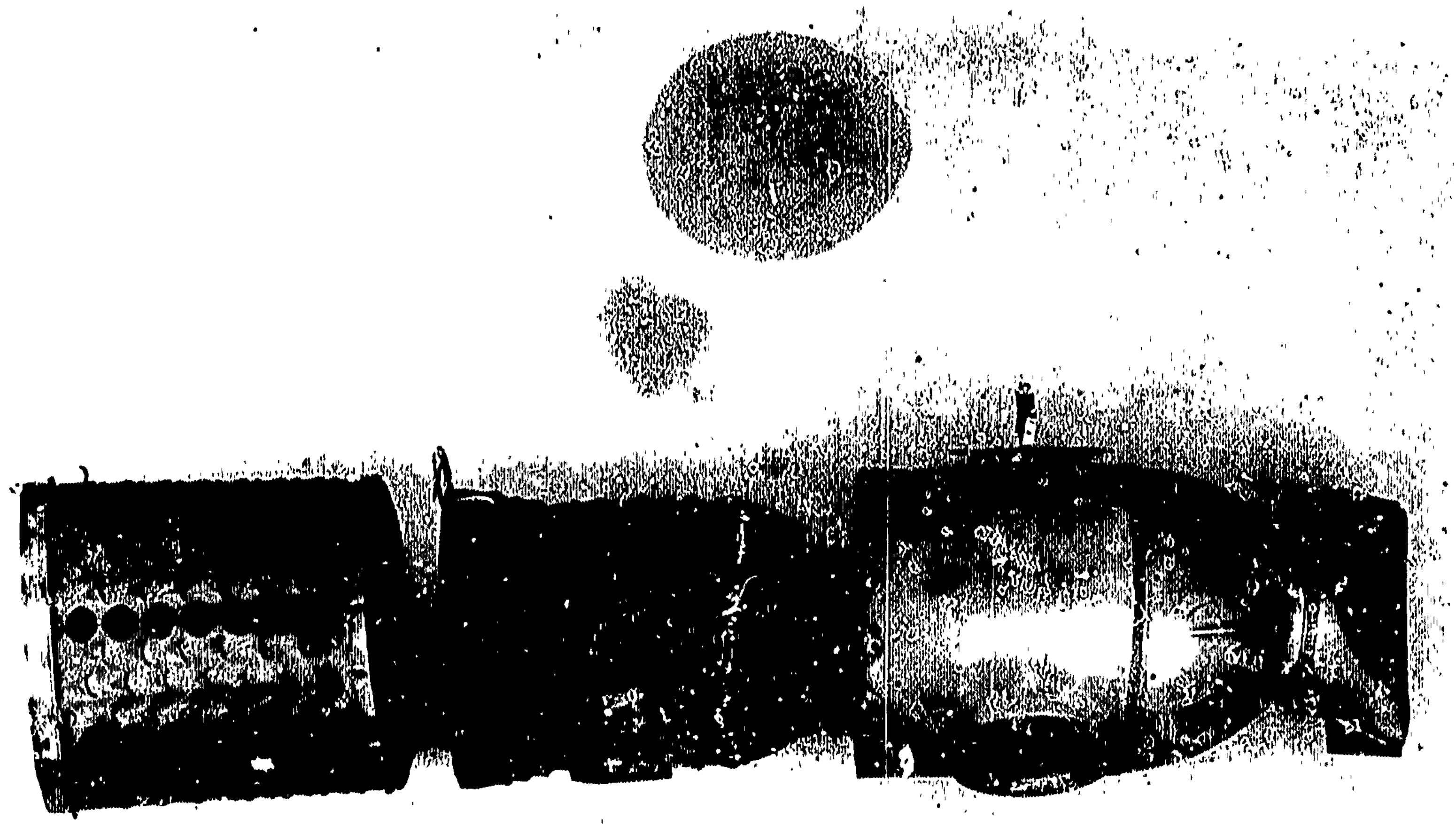
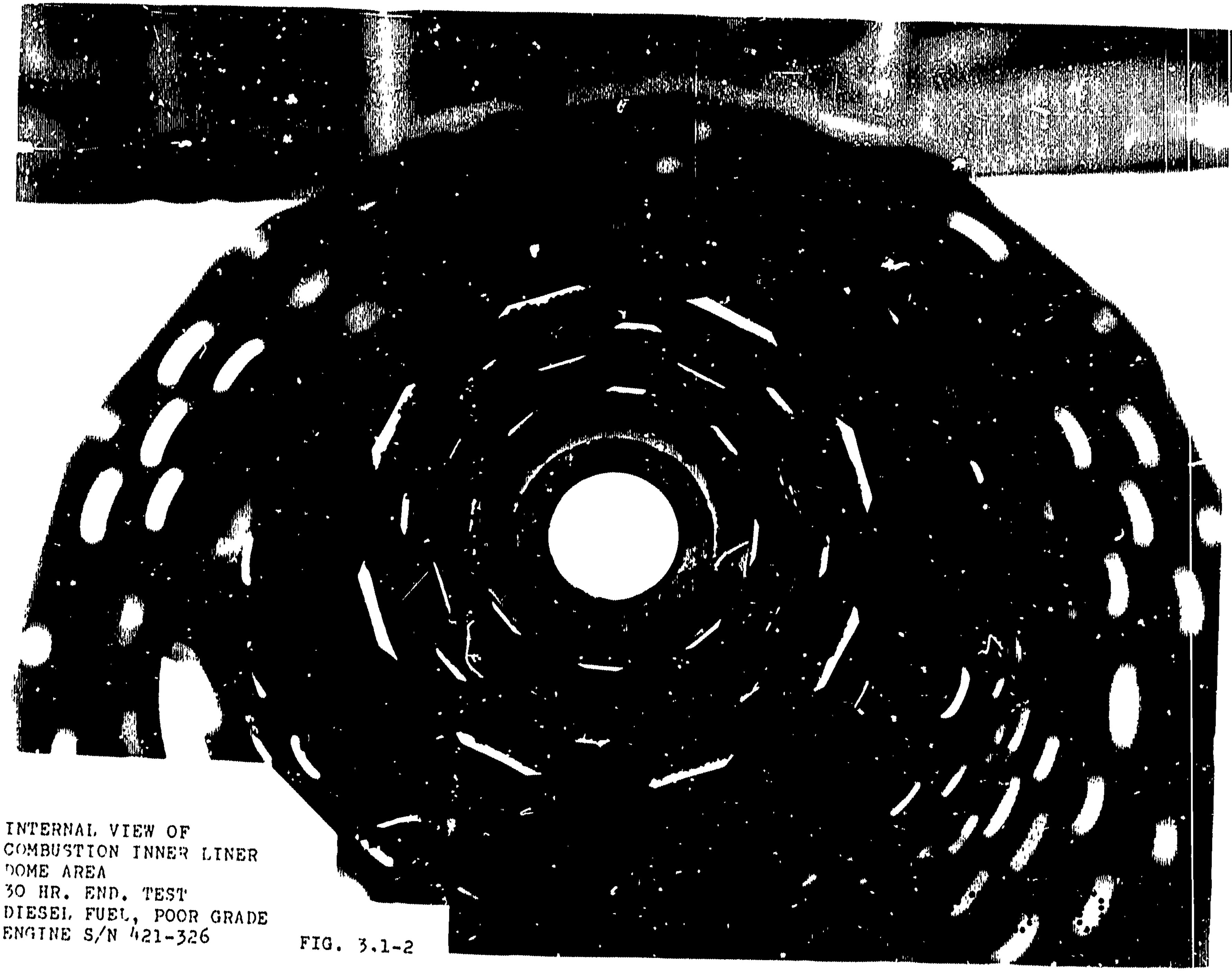


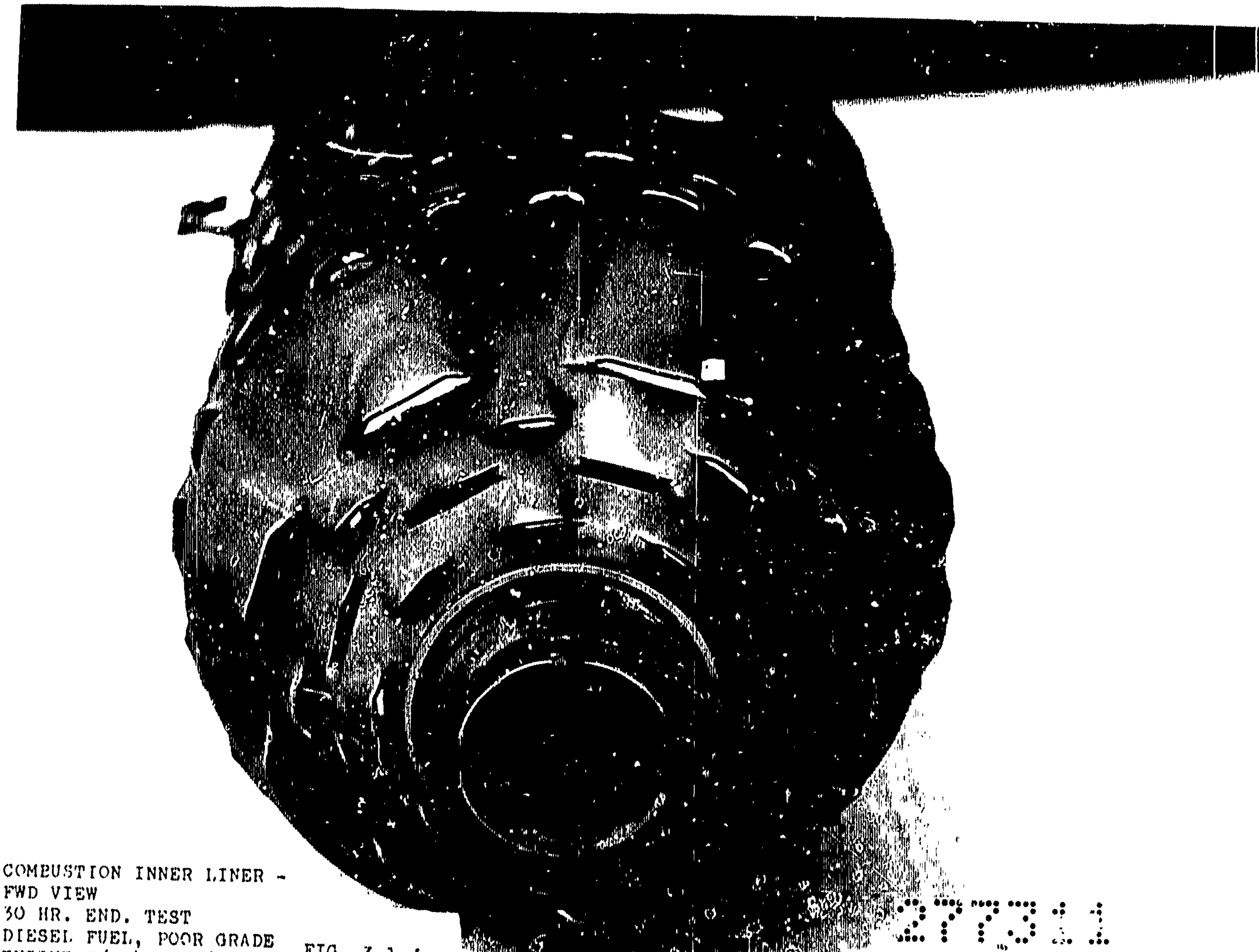
FIG. 3.1-1 COMBUSTION LINER - COMPONENT PARTS
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

277305



INTERNAL VIEW OF
COMBUSTION INNER LINER
DOME AREA
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

FIG. 3.1-2



COMBUSTION INNER LINER -
FWD VIEW
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

FIG. 3.1-5

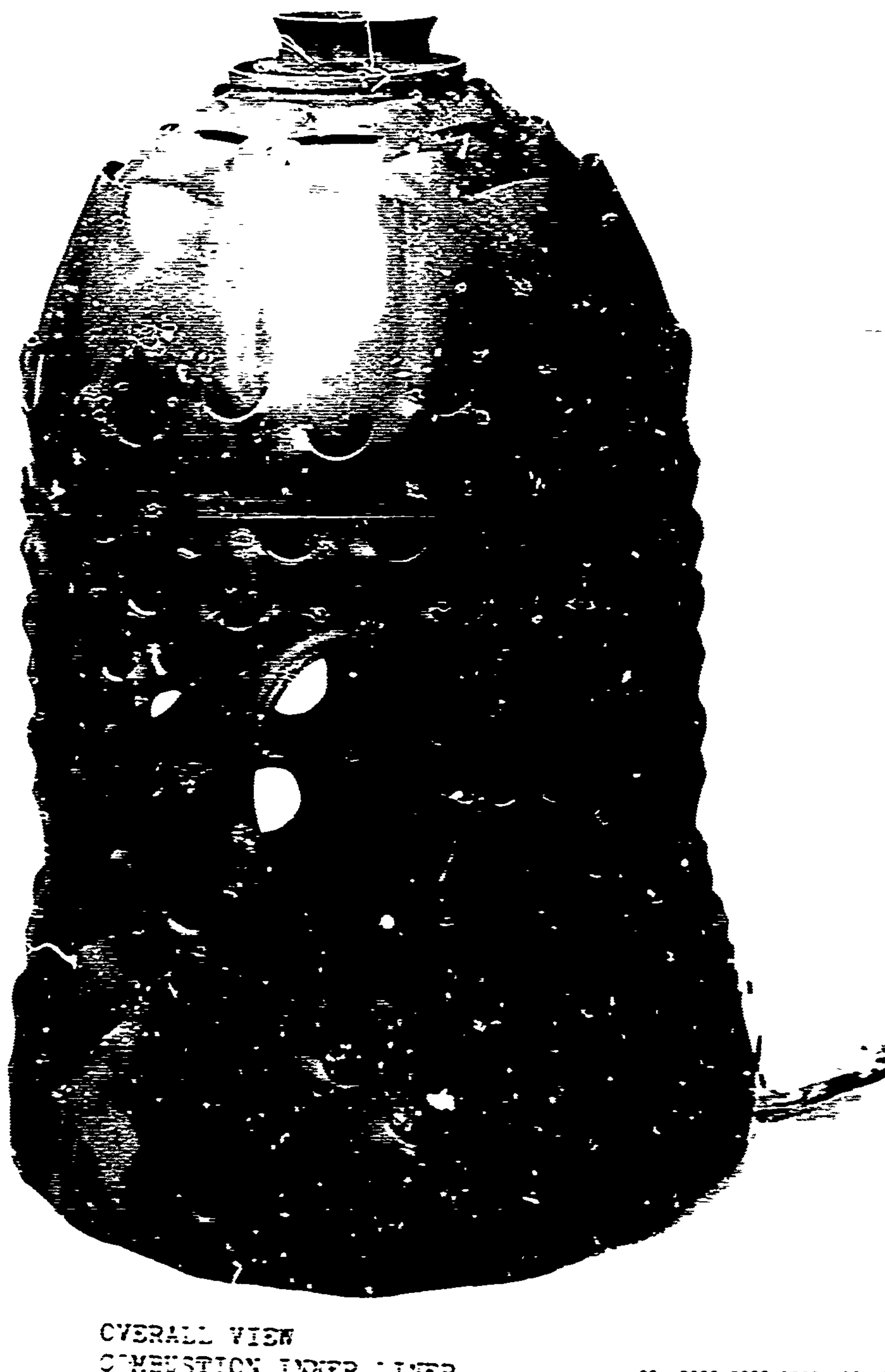


FIG. 3.1-4

OVERALL VIEW
COMBUSTION INNER LINER
50 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENG. S/N 42?-326

277307

COMBUSTION INNER LINER
50 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

FIG. 4.1-5

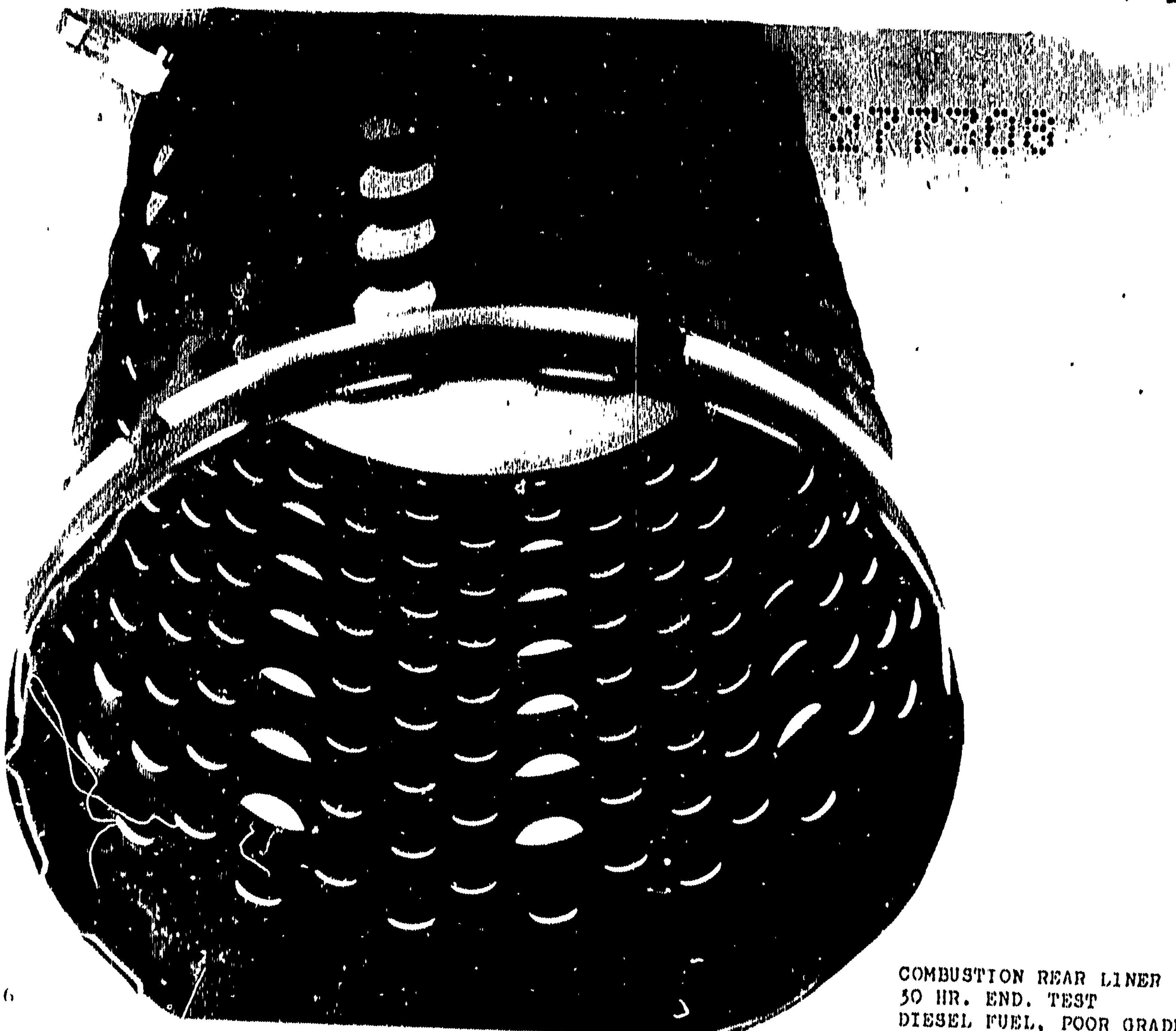


FIG. 4.1-6

COMBUSTION REAR LINER
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

A spectrographic analysis was made of deposits taken from the liner and of the remains of a sample of diesel fuel taken to dryness. The results of these analyses and also the percentage those elements which are present in the liner material, Hastelloy X, are shown in Figure 3.1-7. It can be seen that all the major and minor quantities of the deposits and many of the traces are components of Hastelloy X. This could mean that the deposits contained mostly material from the liners. The fuel analysis, however, showed sodium and iron. This means the sodium in the deposits comes from the fuel, the iron could come from either or both, and the nickel, chromium, molybdenum and cobalt comes from the liners. It is believed that the iron deposits are coming from both fuel and liner since it is a major in the deposits. This indicates that oxidation of the liner was taking place, but it is not known whether or not it is worse than when JP-5 is used.

The appearance of the liners, however, did not indicate that a significant amount of liner corrosion and erosion had occurred. This was supported by the analysis of the turbine blade deposits reference Figure 3.1-20 which revealed only a minor amount of nickel. It would be expected that a major amount of nickel would have been observed in the turbine blade deposits if significant liner burning had occurred since it comprises almost fifty percent of the liner material. It is concluded that the iron in the liner deposits came from the fuel and not the liner material. A color photograph of the internal surfaces of a liner is included in Figure 3.1-8. However, in this photograph colors are not truly representative of the typical ones.

<u>Cross-Fire</u>

Most of the twenty parts revealed a rust discoloration and were covered with an ash-like deposit which was removable with the finger. These parts revealed a hard, crusty-like deposit on the forward cooling louvers while the remainder were generally clean at this location. Figure 3.1-9 shows a typical discoloration pattern (part on right side) and two of the three parts with a deposit on the forward cooling louver.

The visual inspection following a cleaning operation revealed the parts to be in satisfactory mechanical condition with no reported cracks.

<u>Transition Duct</u>

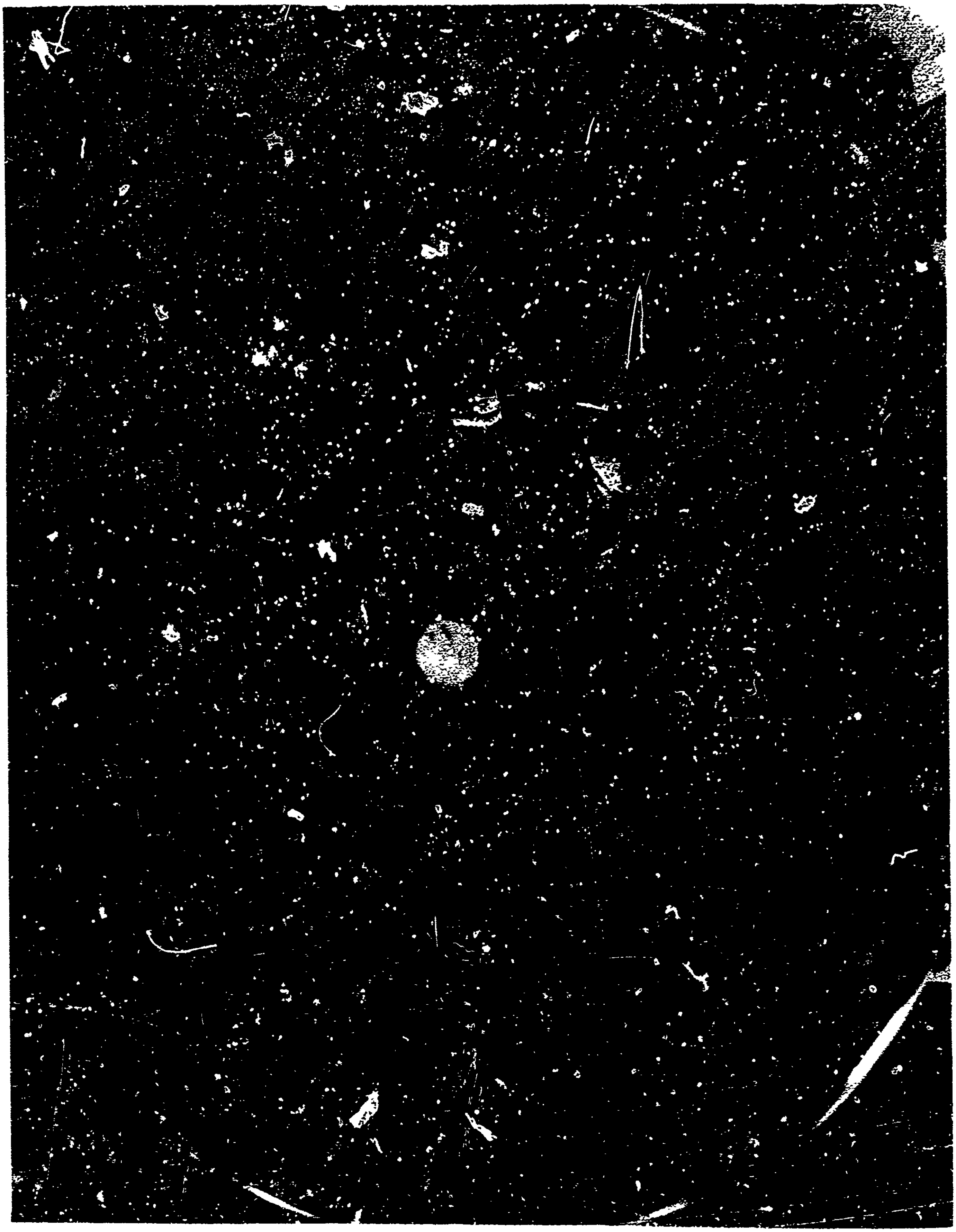
Moderate deposits on the inner skin were located generally behind, and adjacent to, each "saddle" formed by the intersection of the combustion liner ports. This condition is shown in Figure 3.1-10.

SPECTROGRAPHIC ANALYSIS

Element	Presence In Liner Deposit Sample	Presence In Hastelloy X (%) (Liner Material)	Presence In Diesel Fuel
Nickel	major	46.30	
Iron	major	18.50	trace
Sodium	major		
Chromium	minor	22.00	
Molybdenum	minor	9.00	
Cobalt	minor	1.50	
Manganese	trace	1.00	
Silicon	trace	1.00	trace
Titanium	trace		trace
Vanadium	trace	*	
Magnesium	trace	*	trace
Aluminum	trace	*	
Copper	trace		trace
Silver	trace		
Lead	none		trace

*Though not part of the Hastelloy specification these often appear in spectrographic analysis of the alloy.

Figure 3.1-7



COMEUSTION LINER FIG 3.1-8

FIG. 3.1-9

CROSS FIRE TUBES
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

277401

FIG. 3.1-10

TRANSITION DUCT
STG 1 TURB NOZ
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

The internal surfaces of the outer gas passage skin revealed slight build-ups at the step formed by the outer metering seal. All other surfaces of the duct were generally free from deposits. The transition duct did not reveal any abnormal discoloration pattern.

The visual inspection following cleaning revealed no discrepencies. The hard, crusty d sits were not removed during this post-test steam cleaning and solvent wash operation, however.

Stage 1, Turbine Nozzle

This part incorporated instrumentation for the turbine inlet temperature profile and pattern factor test. The instrumentation included false fronts applied over the leading edge of thirty vanes which contained the profile thermocouples. These false fronts were located in five groups of six adjacent vanes; each group located directly behind alternate combustion liners reference Figure 3.1-11 showing overall view of turbine nozzle and Figure 3.1-10 which shows relationship to combustion liners. The post-test condition of these thirty partitions will not be discussed since they were no longer representative vanes. The twenty-eight other vanes revealed a build-up on the leading edge and concave surfaces shown in Figure 3.1-12.

Approximately fifty percent of the 28 vanes revealed these deposits. The convex sides of the vanes revealed slight deposit near the trailing edge at the intersection between vane trailing edge and inner band as shown in Figure 3.1-13. Approximately twenty-five percent of the partitions revealed this condition. The inner and outer gas passage liners were generally free from deposits except as noted previously on other parts.

The twenty-eight instrumented vanes and adjacent inner and outer gas passage liner areas were washed, vapor blasted and fluorescent penetrent inspected following the initial visual inspection. This inspection revealed no discrepencies. The part was in satisfactory mechanical condition. No indication of vane erosion was noted during this inspection. The post-test flow area as measured with the turbine nozzle removed from the engine was 84.82 in^2; a change of -1.7 percent. This measurement was taken before the nozzle was cleaned.

Stage 2 Turbine Nozzle

Approximately fifty percent of the vanes revealed a slight amount of hard, crusty-deposits on their leading edge. The step on the outer band (mating surface with turbine shroud) revealed this same crusty substance on its forward face. These conditions are shown in Figures 3.1-14 and -15. The inner and outer gas passage liners were generally free from build-ups as were the

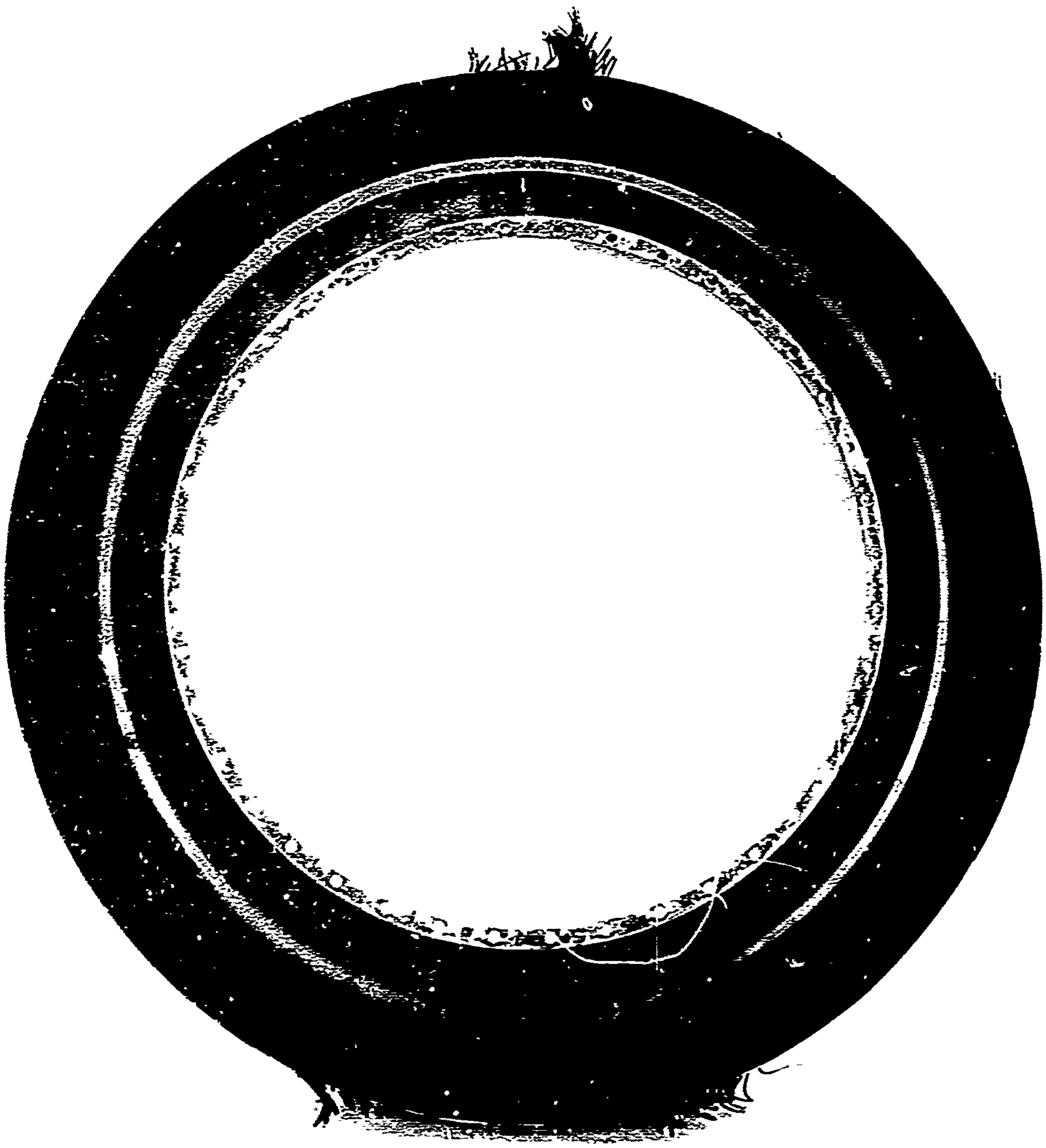


FIG. 3.1-11

STG. 1 TURB. NOZ.
FWD VIEW
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

277306

FWD VIEW
STG L TURB.
NO. 2 VANES
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

277304

FIG. 3.1-12

STG. 1 TURB. NOZ.
AFT VIEW OF VANES
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

FIG. 3.1-13

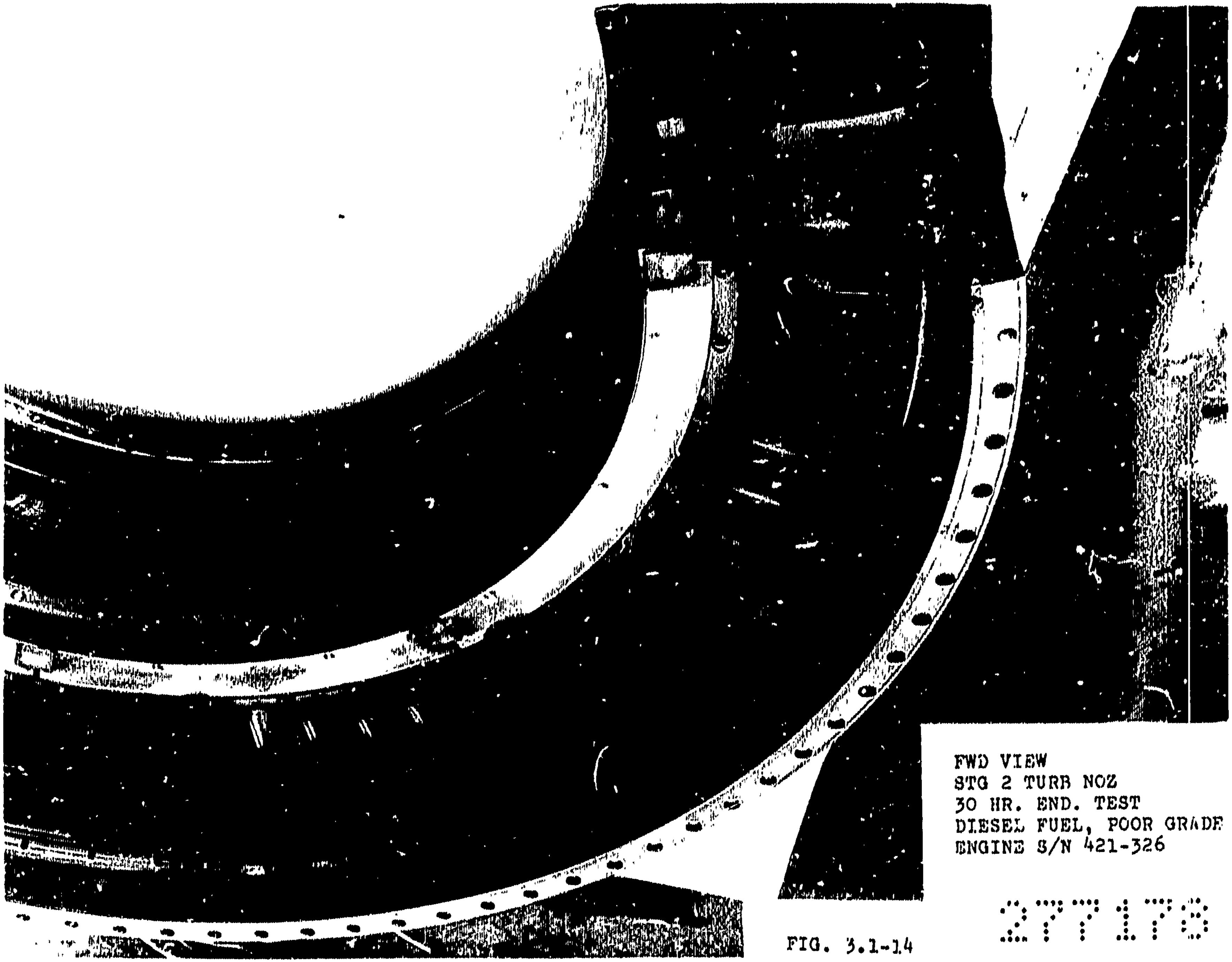
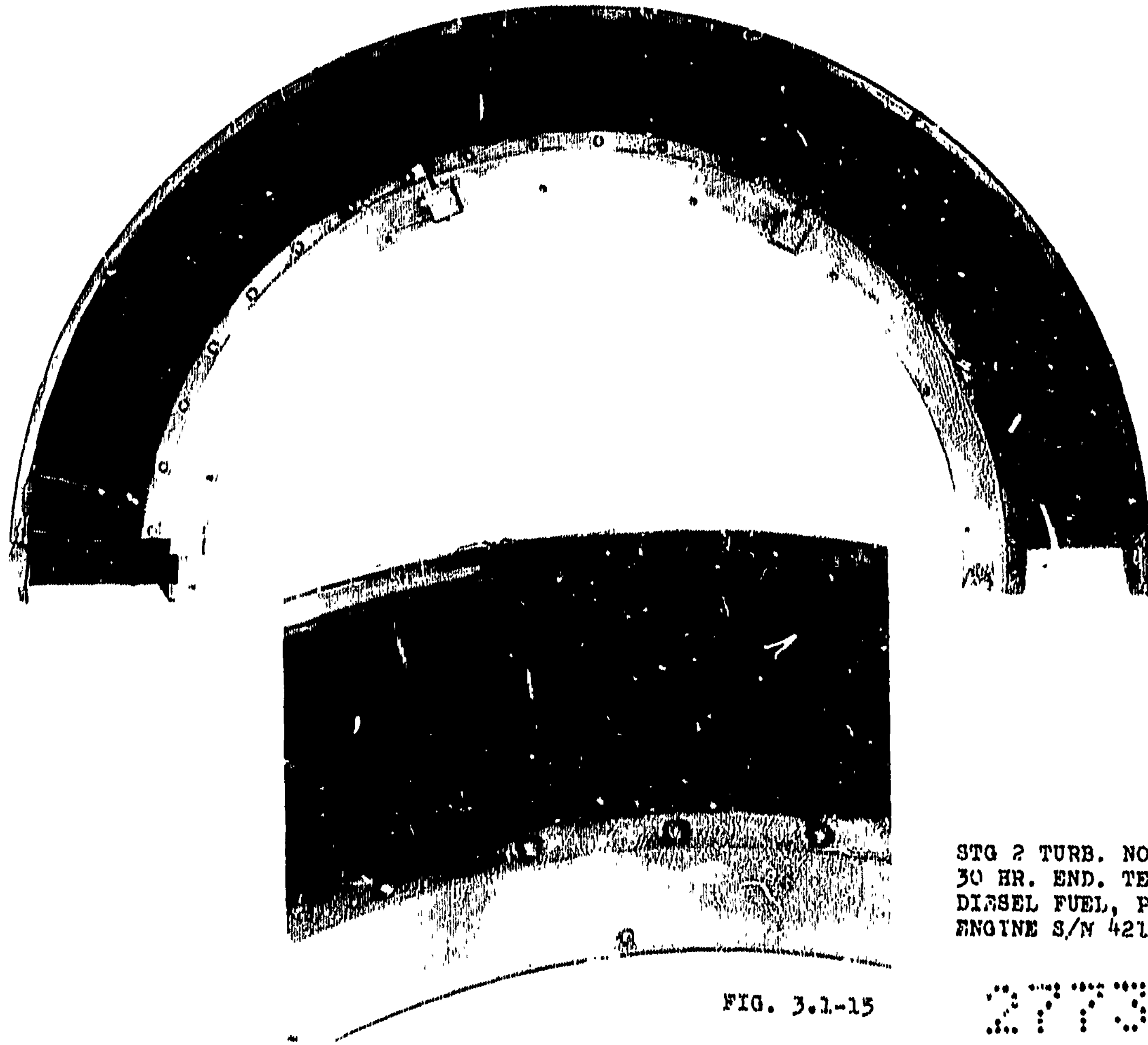

FWD VIEW
STG 2 TURB NOZ
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326
277178

FIG. 3.1-14



STG 2 TURB. NOZ.
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

277300

FIG. 3.1-15

convex and concave vane surfaces. The hard, crusty deposit was the same type as previously noted on other parts. The vanes were discolored, unevenly with a yellow stain (sulfur color) as shown in Figures 3.1-14. (black and white photograph shows areas only).

The visual and fluorescent penetrent inspection following a wash and vapor blast operation revealed the parts to be in excellent mechanical condition. The convex surfaces on the vanes near the trailing edge exhibited a roughened condition but no indication of significant erosion. The vapor blast operation had removed all deposits.

Stage 3 Turbine Nozzle

This part revealed the same yellow uneven discoloration of the vanes as noted on the stage 2 turbine nozzle. However, the vanes and inner and outer gas passage skins were free from build-up except for an ash-like substance removable with the finger.

The visual and fluorescent penetrent inspection following a post-test wash operation revealed the part to be in excellent mechanical condition. The vanes revealed the normal roughening of the convex surfaces near the trailing edge but erosion was not discernible. Figure 3.1-16 shows the excellent post-test condition of the part.

Turbine Frame

The gas passage areas were covered with an ash-like substance which was removable with the finger. The post-test wash operation removed this material and the part was found in excellent mechanical condition.

Turbine Rotor

The post-test conditions of the turbine rotor is shown in Figures 3.1-17 and -18. As shown in these photographs, the stage one turbine blades exhibited a heavy deposit on the leading edge and concave surfaces. The turbine rotor is rotated 180° between pictures. The convex surface of the stage one blades were generally free from the build-up. The stage 2 turbine blades revealed a very light amount of this build-up on the leading edges only; while the stage 3 blades were essentially clean.

All three stages of turbine blades were removed from the rotor spool, and then washed, vapor blasted (standard practice) and hot fluorescent penetrent inspected. This inspection revealed all blades in satisfactory mechanical condition. No foreign object damage was observed nor was a significant amount of airfoil erosion noted during these inspections.

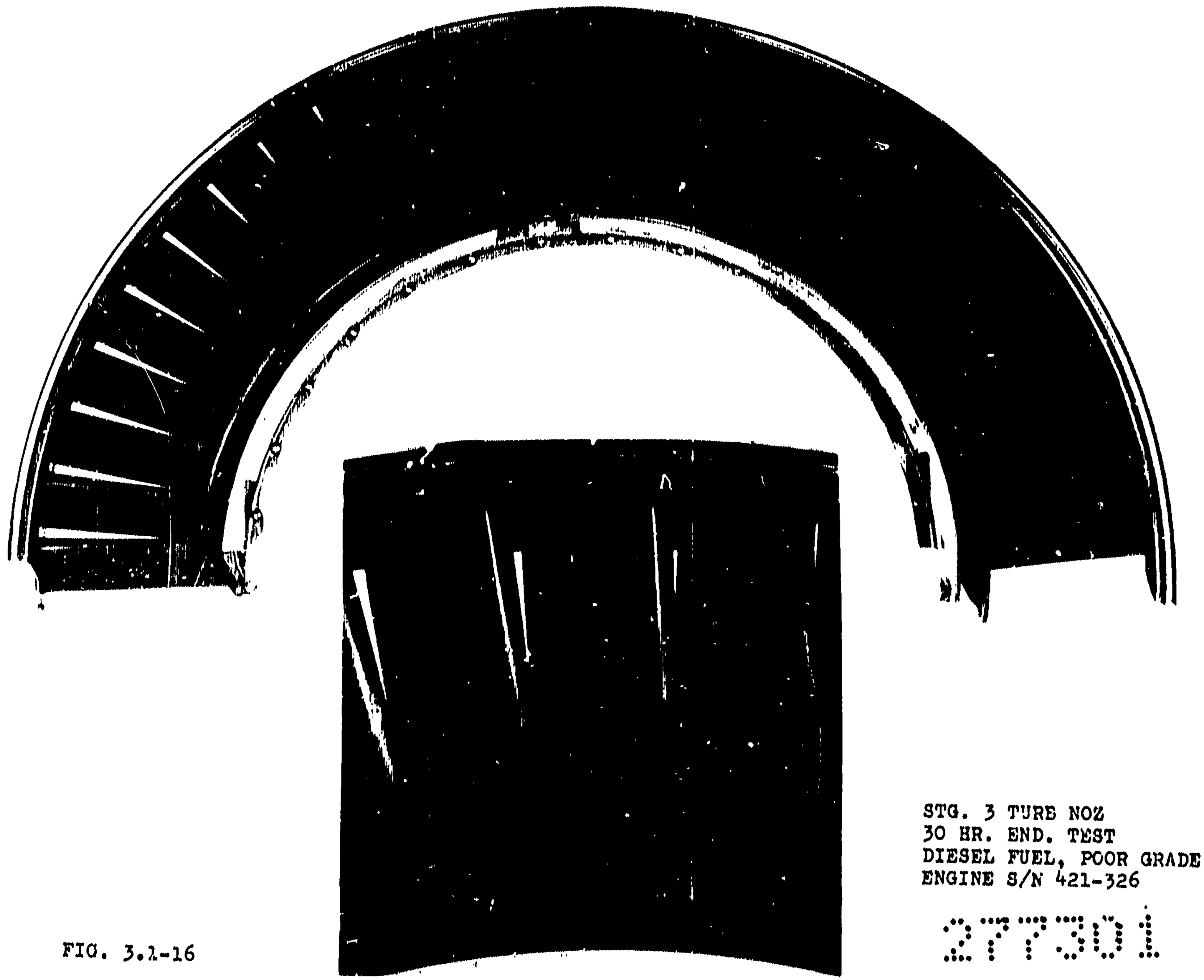
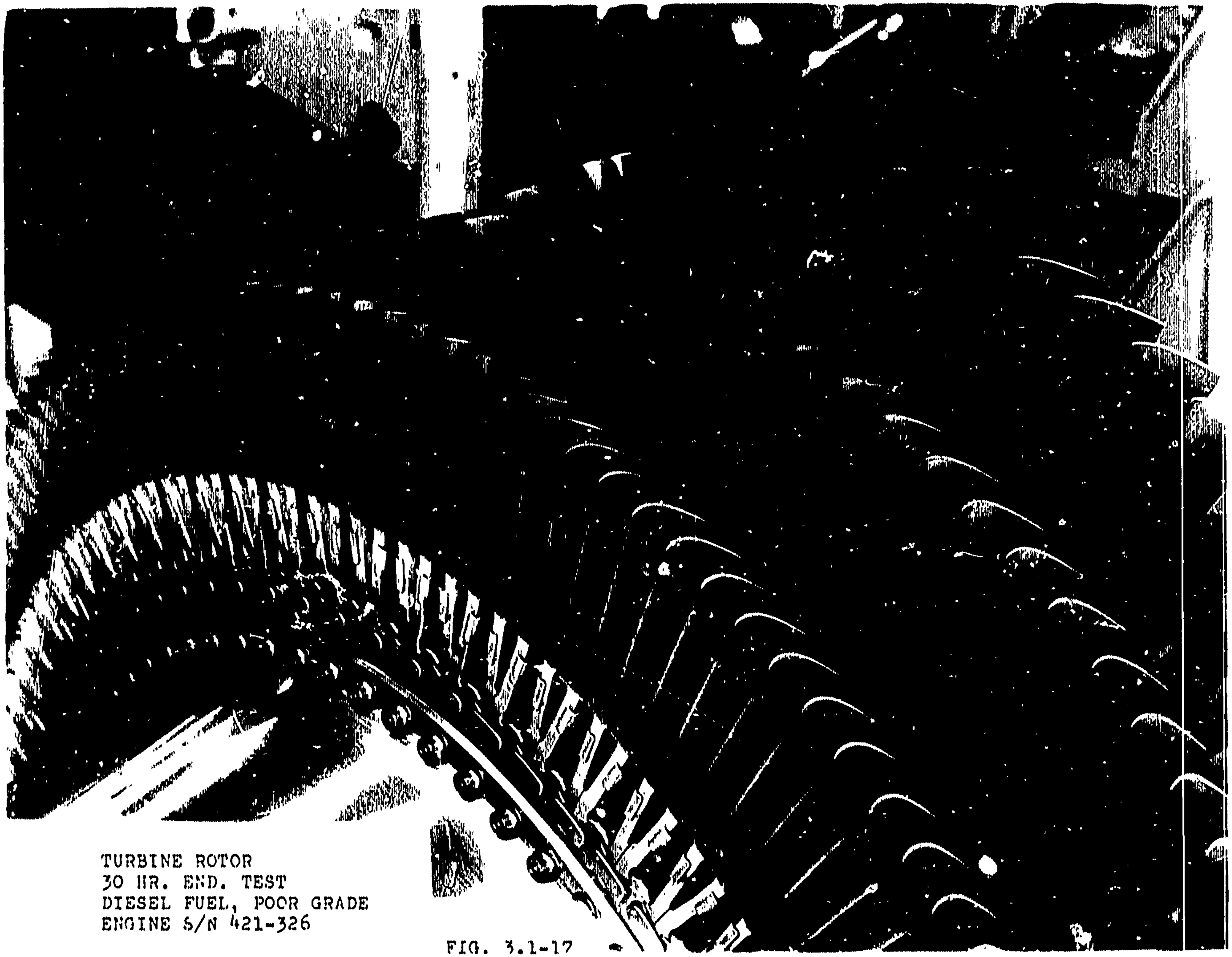
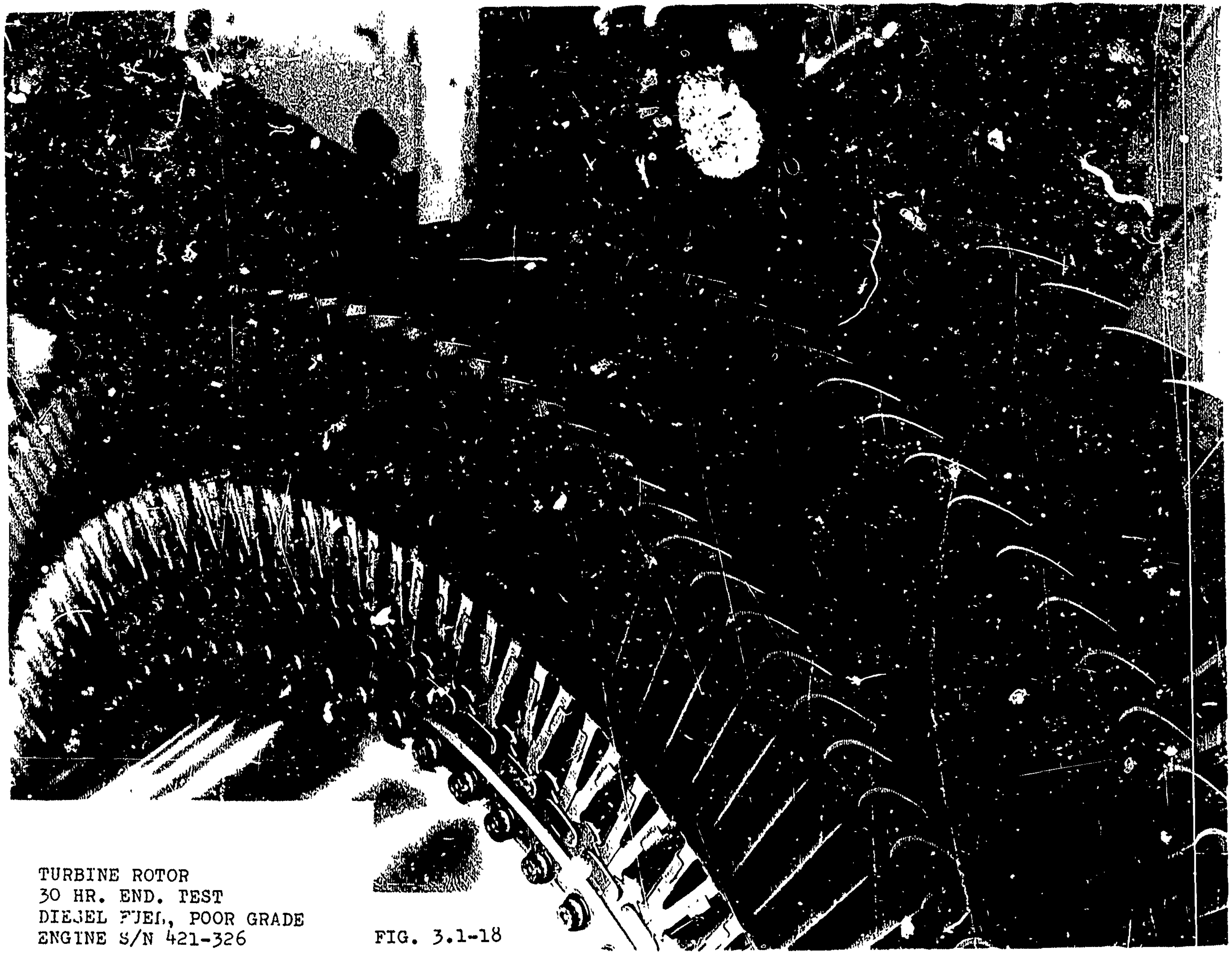

STG. 3 TURB NOZ
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326
277301

FIG. 3.1-16



TURBINE ROTOR
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

FIG. 3.1-17



TURBINE ROTOR
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

FIG. 3.1-18

Eight of the stage one turbine blades were submitted to the Vibration Laboratory, for determination of the first flexial mode in the free state prior to and again after the deposit was removed. The results of these tests were as follows:

S/N	Leading	Trailing	With Deposit	With Deposit Removed	Change
SJC1138	X		2423 cps	2406 cps	-17 cps
KUM348	X		2459 cps	2445 cps	-14 cps
KUV794	X		2438 cps	2418 cps	-20 cps
KSN22	X		2380 cps	2358 cps	-22 cps
Cx48Y			2443 cps	2428 cps	-16 cps
DG140			2487 cps	2469	-18 cps
CO48E			2487	2469	-16 cps
DG06A			2435	2486	-18 cps
			2504		

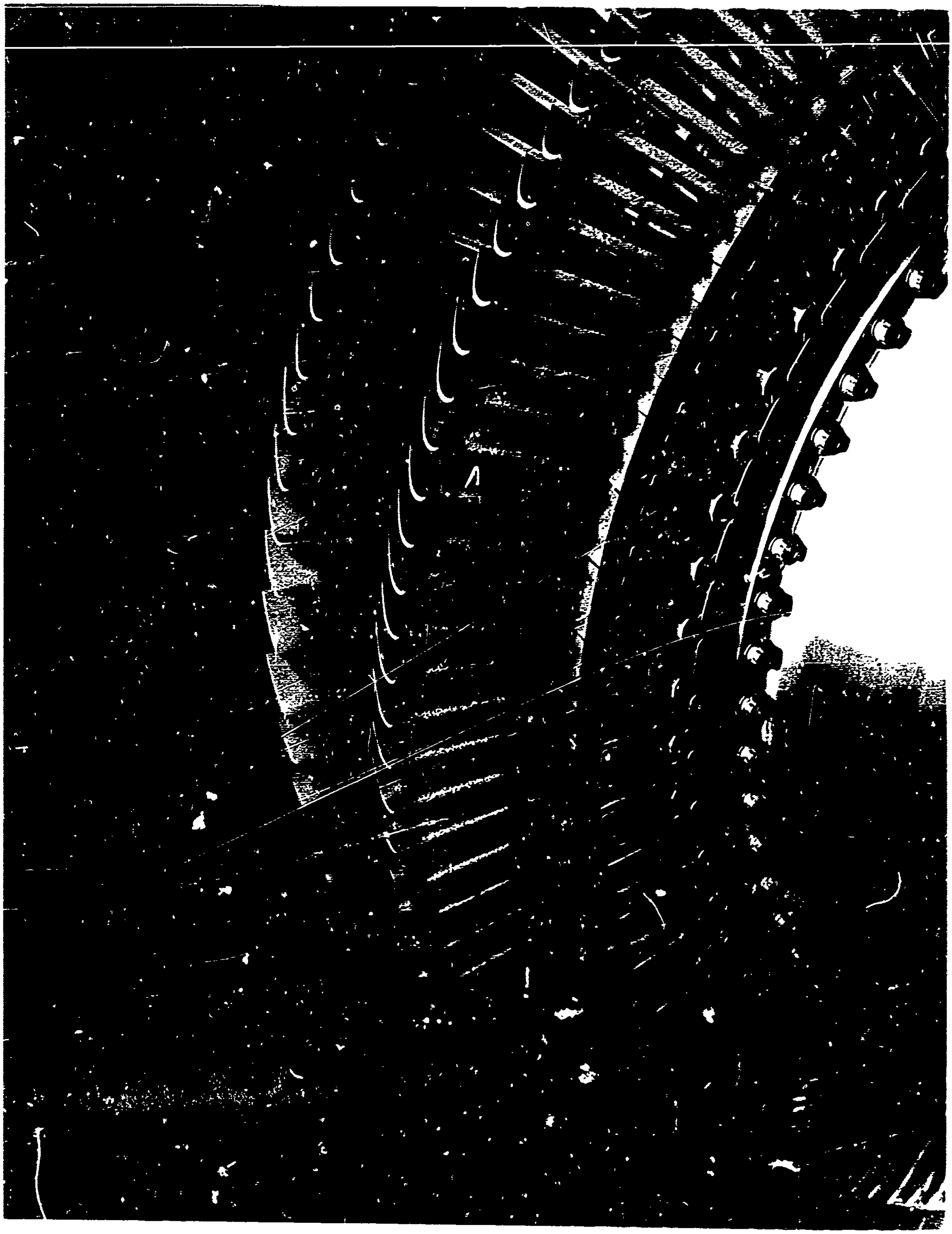
This change, less than one percent, is considered insignificant with respect to blade capabilities.

A sample of the deposit was subtained from the stage one blades and submitted for spectrographic analysis. The results concerning this analysis are presented in Figure 3.1-20. As noted in these results, the major ingredients of the deposit were iron and sodium with a minor amount of cobalt and nickel. As presented in Figure 3.1-17, the sodium and iron came from the fuel, refer Section 3.1. Why not? Carbon does not appear in the blade deposit analysis due to method used, however, it is considered the major ingredient. why. The presence of only a minor amount of both nickel and cobalt indicates that the main source of the deposit is not from burning or oxidation of the combustion liners.

The deposits noted on the stage one blades are not considered to have a significant effect on the mechanical capabilities of the turbine blades. A color photograph Figure 3.1-19 shows the turbine rotor.

Fuel Nozzles

All ten parts revealed a moderate to heavy carbon build-up on the air shroud faces and around the secondary surface which could not be removed by ordinary means. Figure 3.1-21 shows this condition. The inserts in this photograph are S/N 38658 (4th from left in group shot) and a new P5 part procured for comparative purposes. No other discrepencies were noted during this post-test inspection.



TURBINE ROTOR

FIG 3.1-19

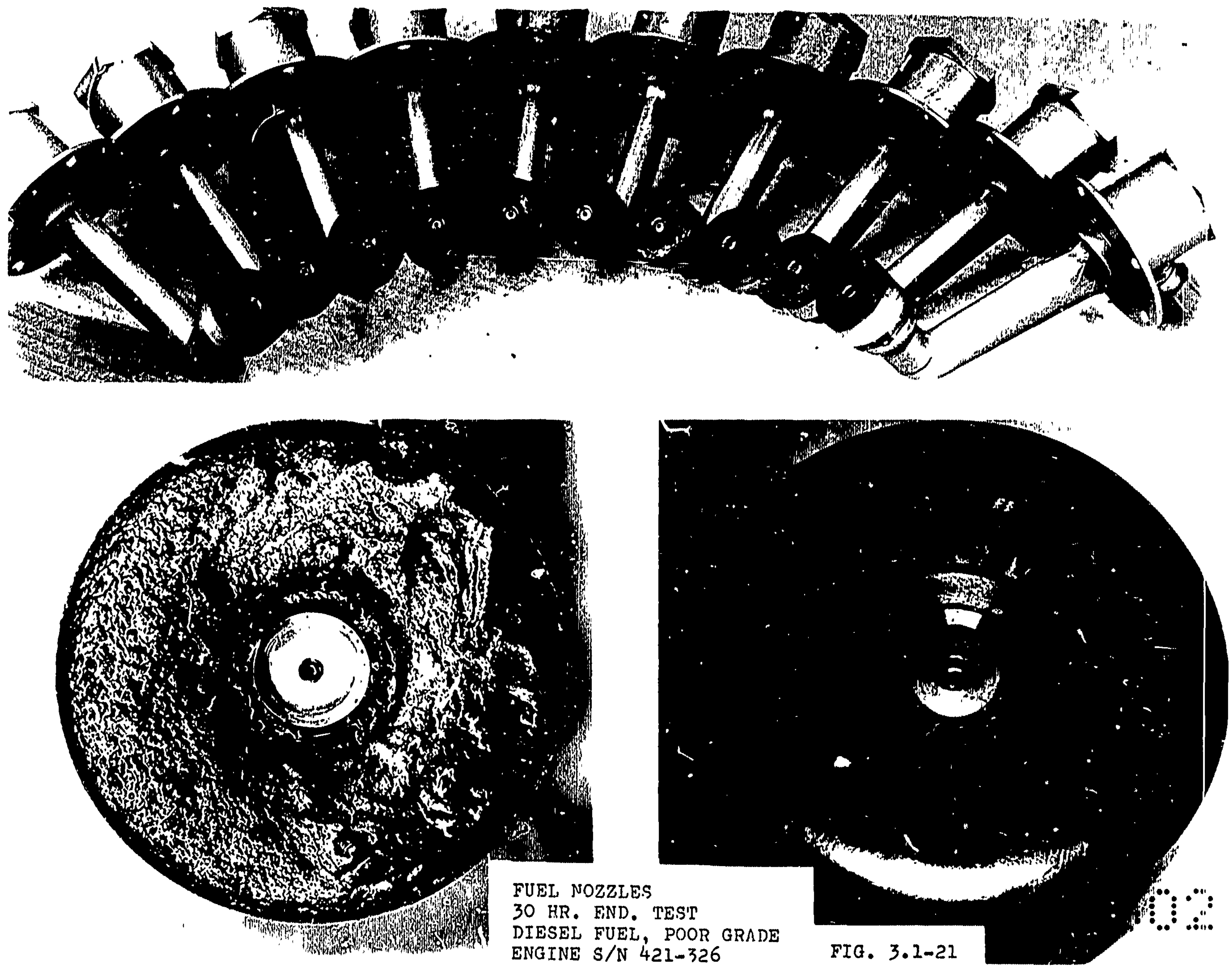
DEPOSIT ANALYSIS

Spectrographic analysis of the crusty deposits on the first stage buckets of the LM1500 test engine operated 30 hours on MIL-16884D diesel fuel is as follows:

Trace	Al	Minor	Co
	Ag		Ni
	Cr		
	Cu	Major	Na
	Mg		Fe (very strong)
	Mn		
	Mo		
	Pb		
	Si		
	Ti		

What % of total

Figure 3.1-20



FUEL NOZZLES
30 HR. END. TEST
DIESEL FUEL, POOR GRADE
ENGINE S/N 421-326

FIG. 3.1-21

As shown in Figure 3.1-21, some carbon build-up was observed around the perimeter of the secondary orifice. A post-test bench check was performed to determine if this build-up was interfering with the fuel spray. This bench check revealed the fuel sprays for each nozzle to be within the prescribed spray angles and that no interference from the carbon build-ups was observed. The carbon build-up around the secondary orifice was not considered significant unless it progresses to a point at which it would interfere with the fuel spray.

The condition of carbon build-up on the fuel nozzle shroud faces was not considered a serious detrement to the life of the fuel nozzle. A recently completed 510 hour endurance test of a J79-15 model engine revealed this same condtion of carbon build-up on the fuel nozzle air shroud faces. The test report concerning that inspection and testing completed during the period of June 1963 - October 1963 revealed no abnormal effects on the combustion liners as a result of the carbon build-up on the fuel nozzle shrouds.

Two P5 parts and the P6 part were removed and inspected during the combustion liner inspections following each 10 hour endurance cycle. These inspections revealed that the carbon buildups varied with time; however, photographs taken at each interval were not successful in showing this condition. A color photograph Figure 3.1-22 taken of the typical shroud face is included.

The carbon build-ups on the shroud faces and around the secondary orifices were not removed from the parts since these same parts may be installed in this condition for Phase II in order to determine build-up rates.

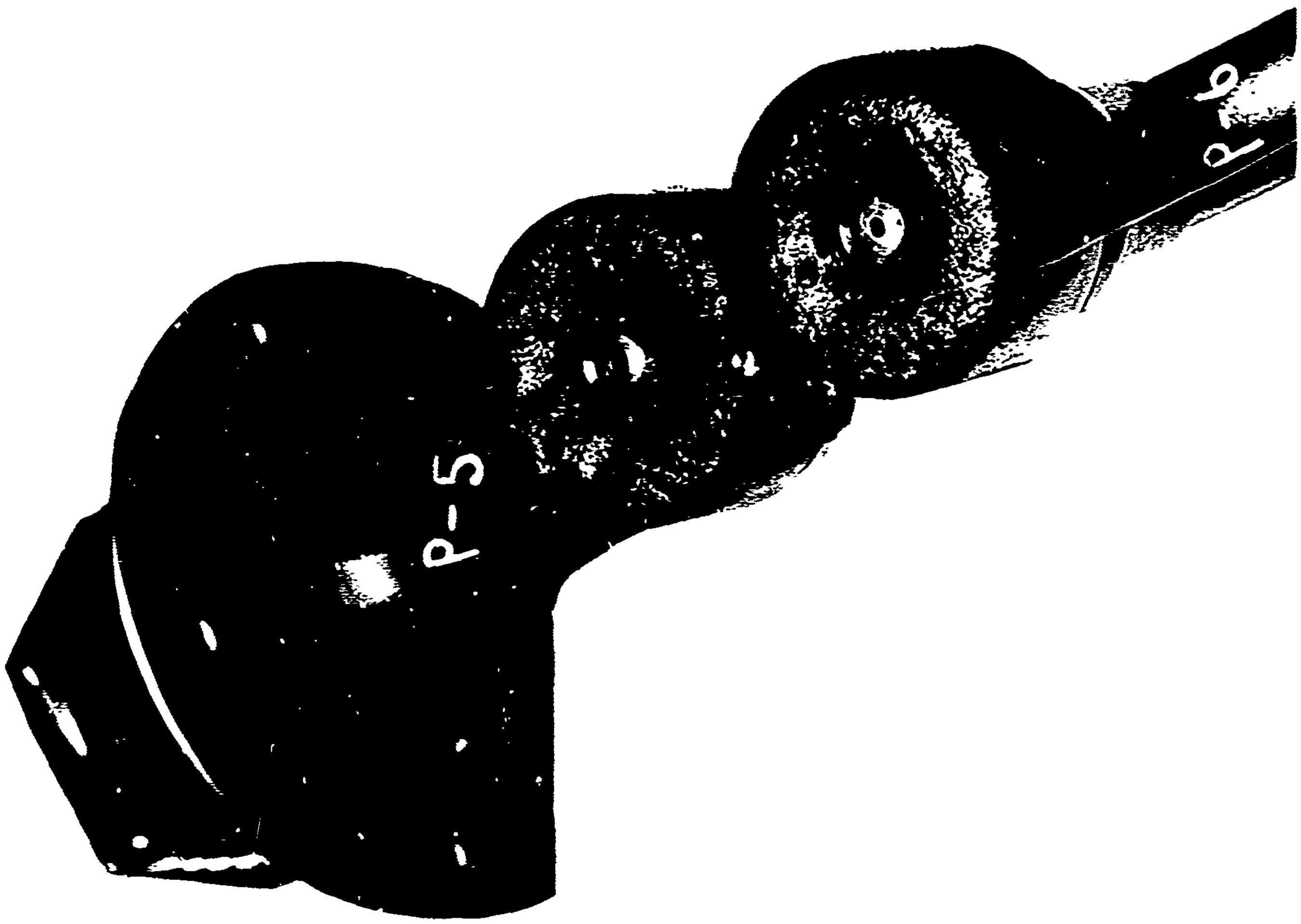
Spark Plug

The spark plug revealed moderate carbon build-up on the immersed tip face as shown in Figure 3.1-23. No other discrepancy was noted during the post-test inspections. This condition was not considered significant since the engine completed a total of thirty-one starts during the cold-start test following the thirty endurance hours with no reported misfires.

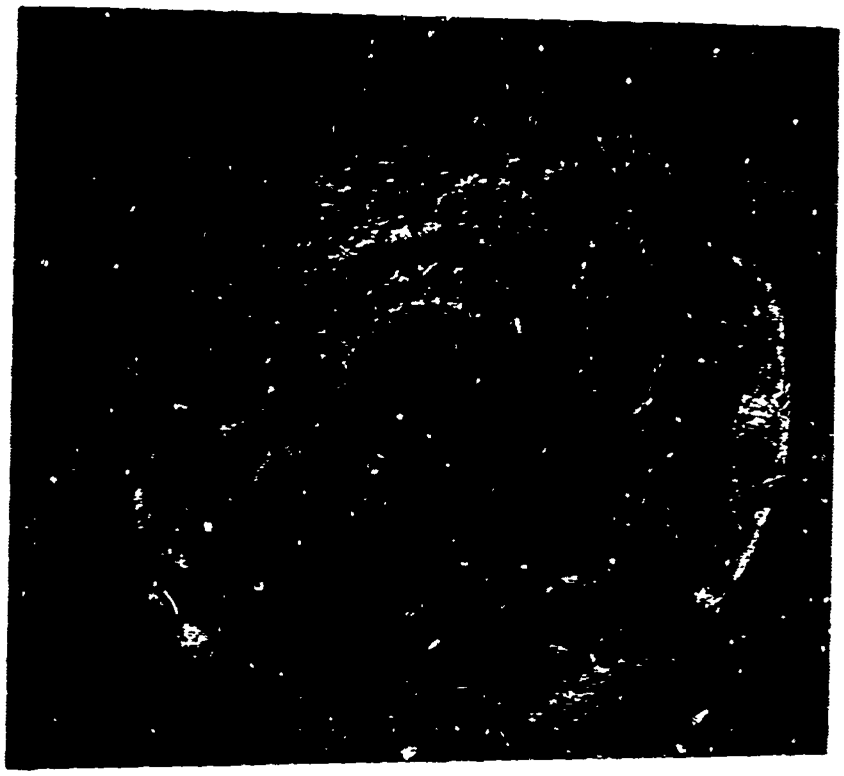
3.2 Engine Operation and Performance

3.2.1 Operational Characteristics

No operational discrepancies were encountered throughout the entire test program and the operational characteristics of the engine were considered satisfactory. The smoke from the engine exhaust was noticeably heavier while burning diesel fuel compared with that experienced while burning JP-5 fuel. Figure 3.2.1-1 shows smoke from the cell



FUEL NOZZLES FIG 3.1-22



S/N

SPARK PLUG
IMMERSED TIP
30 HR. END. TEST
ENGINE S/N 421-326

277082

FIG. 3.1-23

30 HR. END. TEST
[illegible]
[illegible]

exhaust stack while operating the engine with diesel fuel at the 11,000 horsepower test point. No significant amount of smoke from the exhaust stack was noted while burning JP-5 fuel at the similar engine power level.

Numerous sparks were noted in the exhaust stream exiting from the engine conical exhaust nozzle particularily at the 14,000 horsepower test point. These sparks were yellow to red in color and were not considered significant during the testing since this type of spark is indicative of the presence of carbon particles in the exhaust.

All engine accelerations and decelerations were completed at an approximate rate of 80 rpm/sec (30 seconds idle to max power) to reduce thermal shock to the turbine inlet instrumentation and thereby increase its useful life. These slow transients produce more severe engine operating condition with regards to producing carbon build-up than that which normally will be encountered in actual operation on a J79-8 engine.

3.2.2 Performance

Performance testing during Phase I of the Marinization Program consisted of:

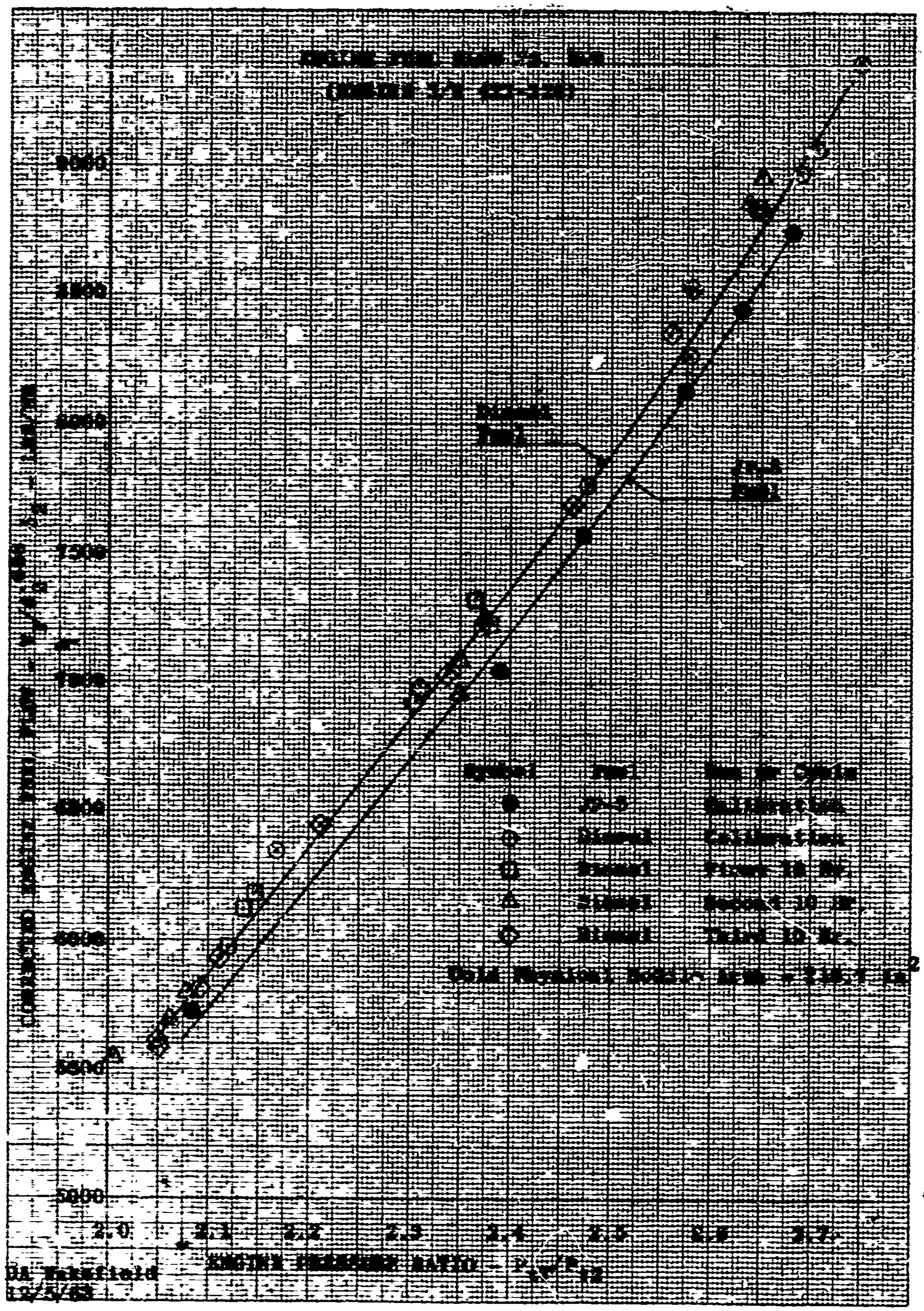
1. Calibration run on JP-5 fuel
2. Initial checkout on diesel fuel
3. Three 10-hour endurance cycles on diesel fuel. Each ten hour cycle consisted of 1 hour at 14,000 hp setting; 4.5 hours at the 11,000 hp setting and 4.5 hours at the 7,000 hp setting.

There was no measurable change in engine performance between the calibration runs on JP-5 fuel and on diesel fuel. A comparison of the solid circular and open circular symbols on Figures 3.2.2-1 through -6 shows that there was no unexpected change in performance during the initial calibration and temperature profile runs on JP-5 and diesel fuel. The only observable change is in parameters involving fuel flow which changed by the ratio.

$$\frac{(\text{LHV } X\eta_B) \text{ JP-5}}{(\text{LHV } X\eta_B) \text{ Diesel}} = 1.023$$

As this ratio indicates, this change is due to the difference in the lower heating value and the combustion efficiencies for JP-5 and diesel fuel. The values for the lower heating values are:

JP-5	18580 Btu/lb
Diesel	18312 Btu/lb



TSA-241-1

FIG. 3.2.2-1

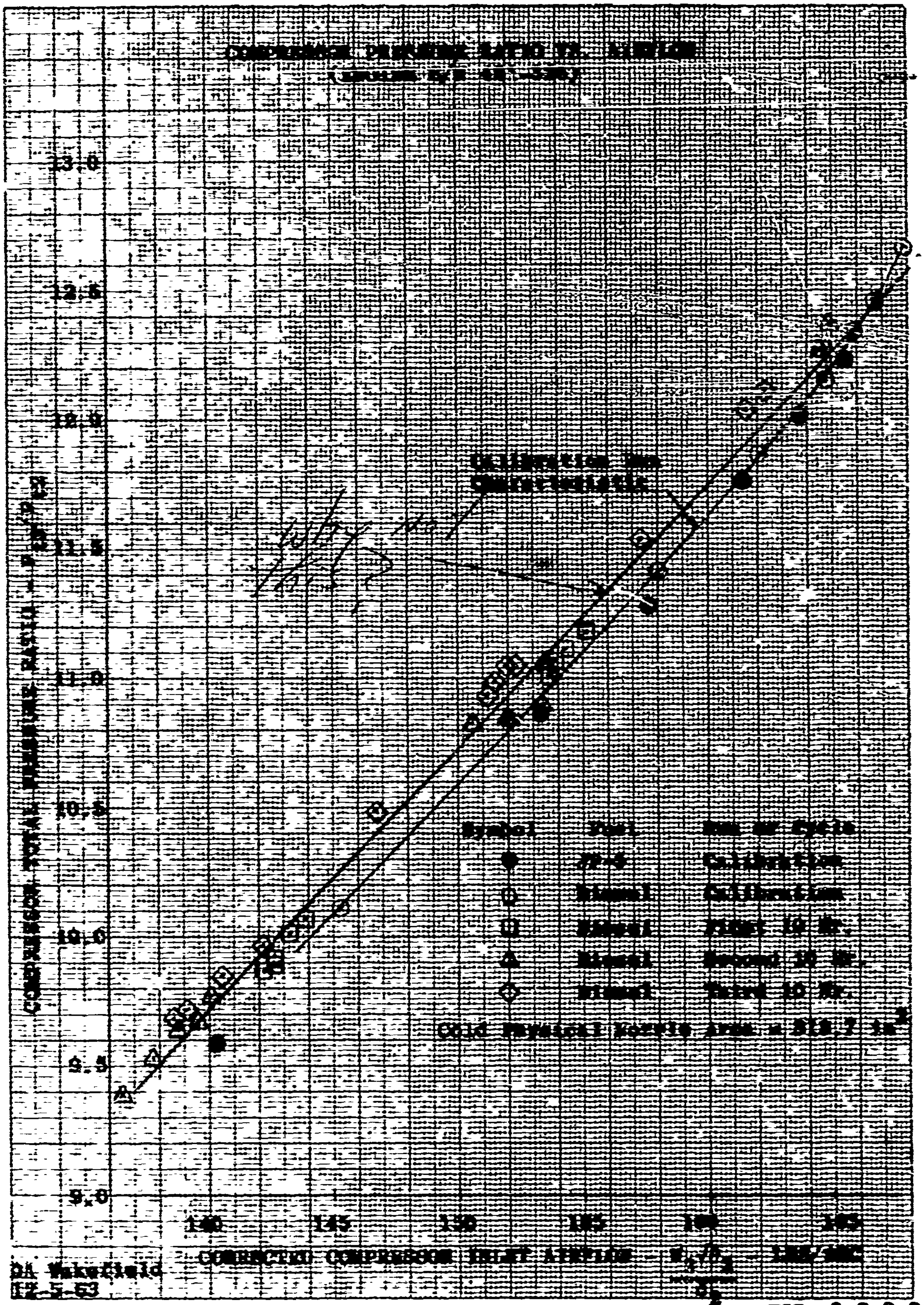
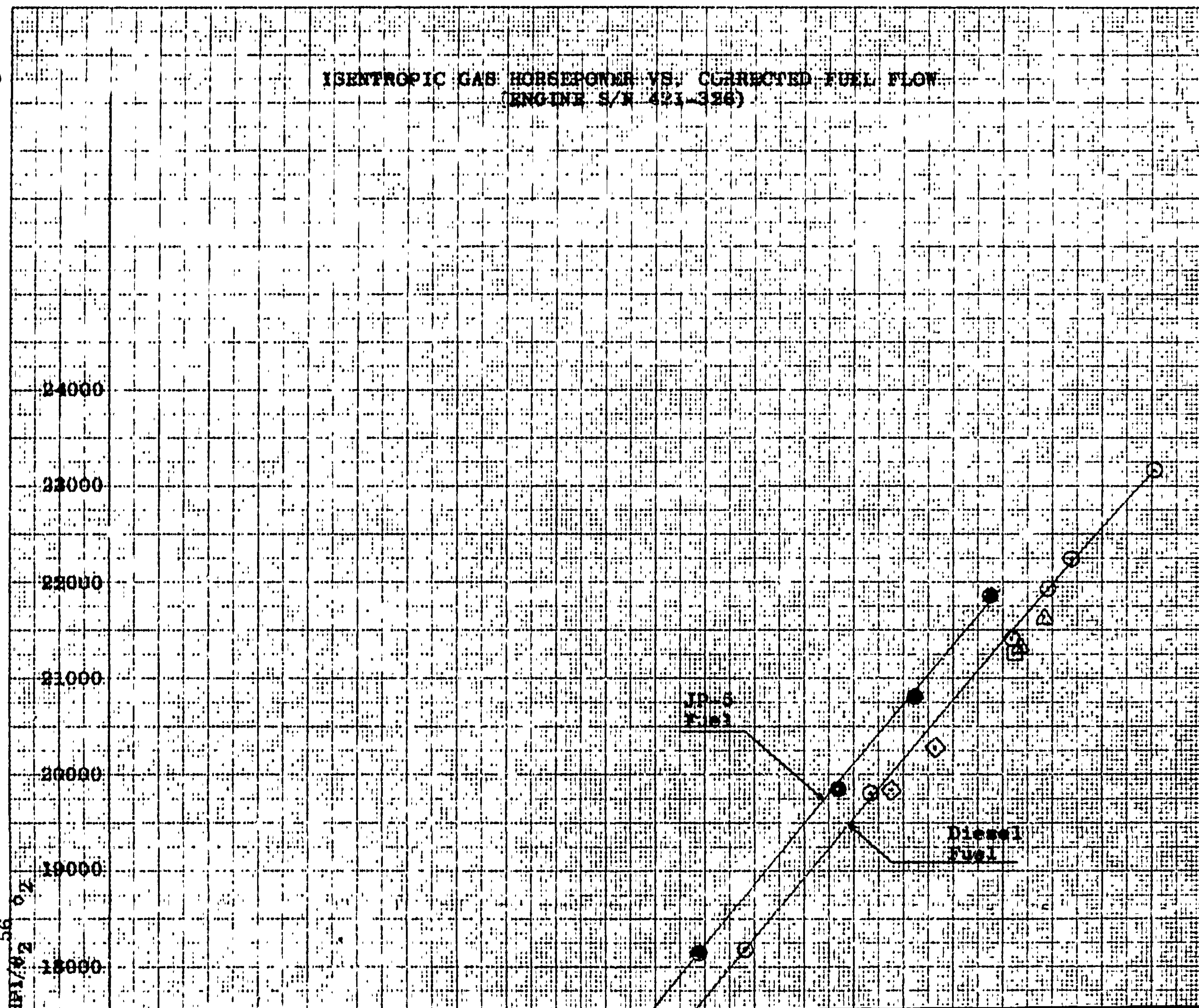
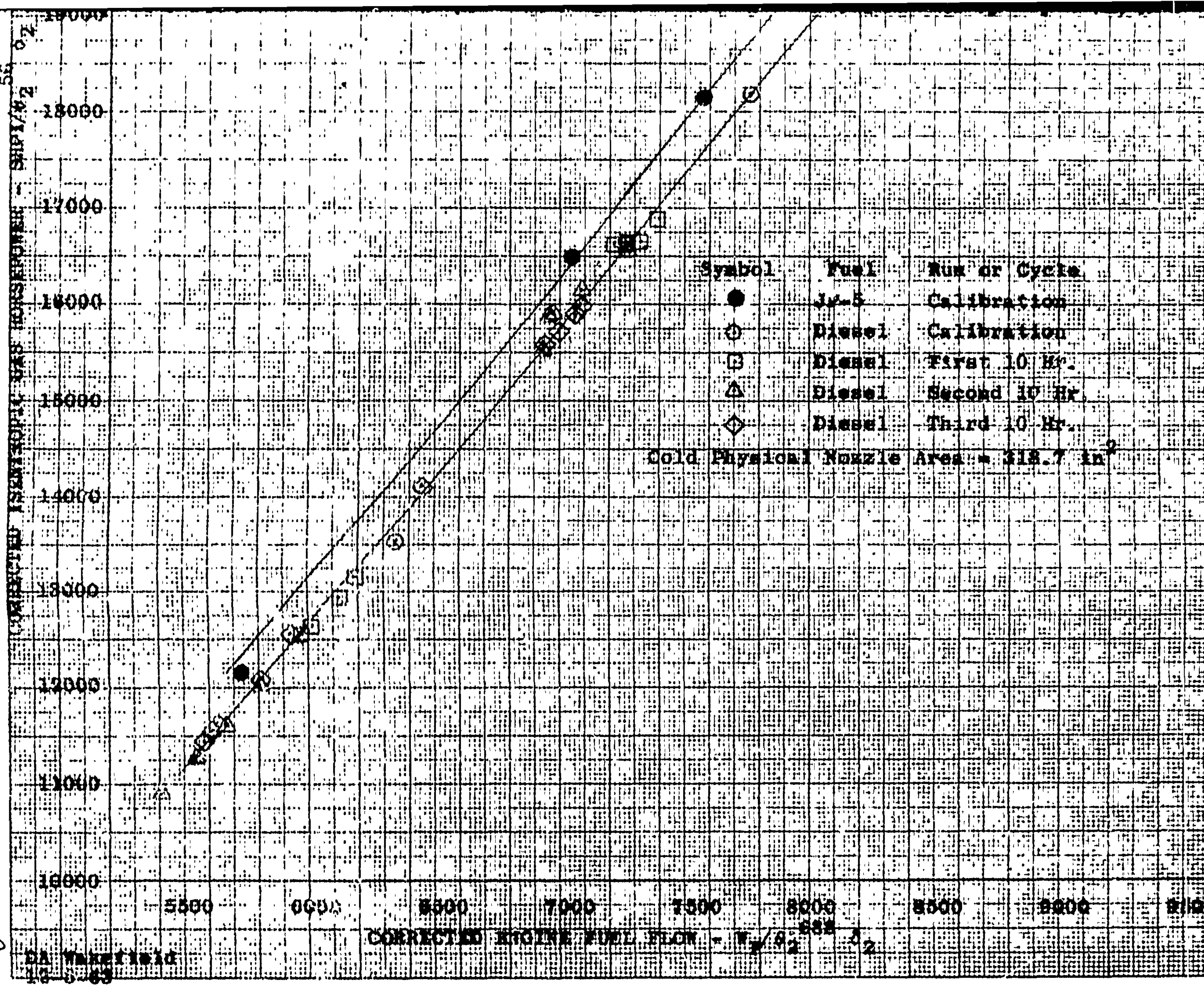


FIG. 3.2.2-2
TSA-241-2



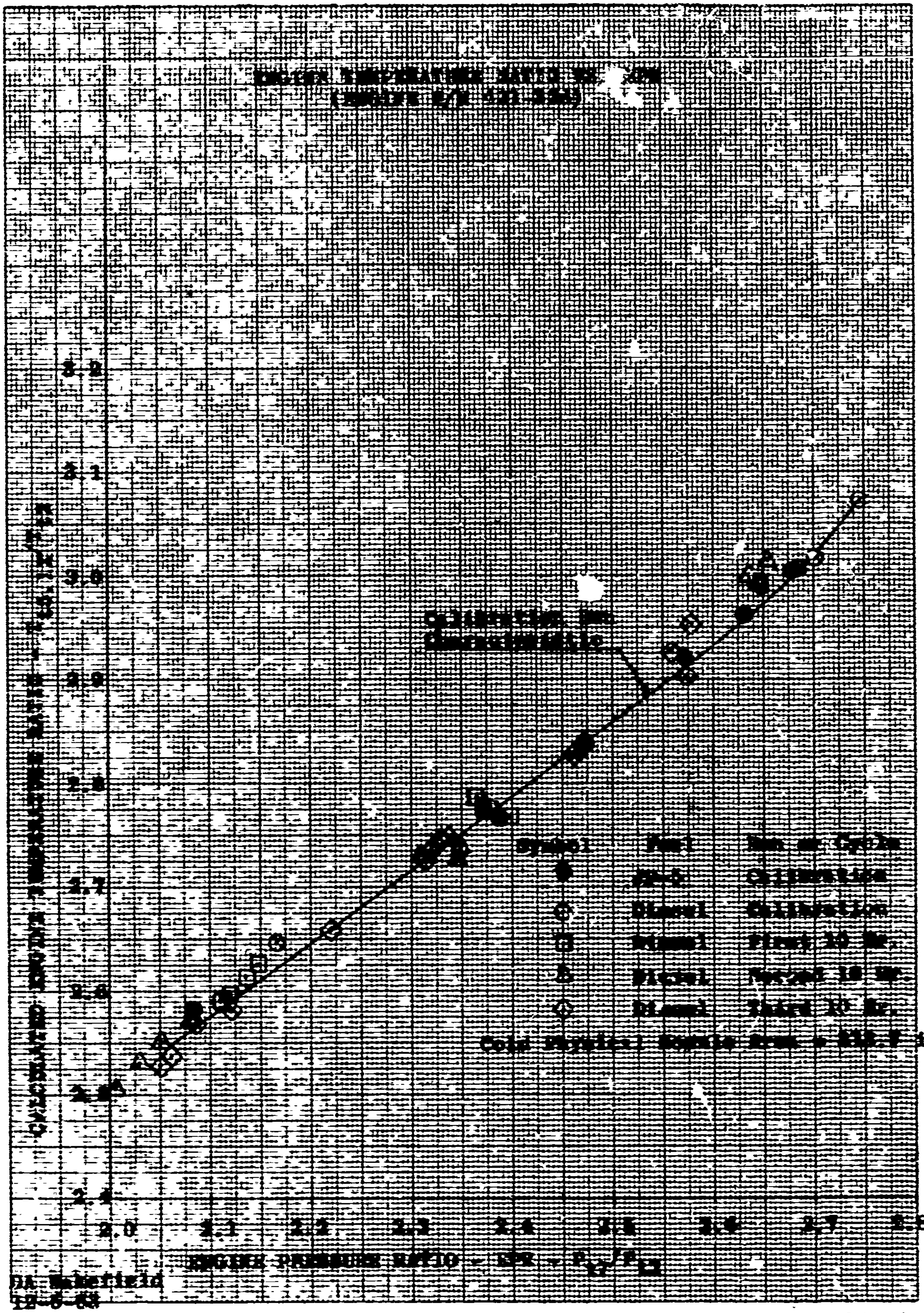
ISENTROPIC GAS HORSEPOWER VS. CORRECTED FUEL FLOW
(ENGINE S/N 421-326)
24000
23000
22000
21000
20000
19000
18000
JP-5
Fuel
Diesel
Fuel

A



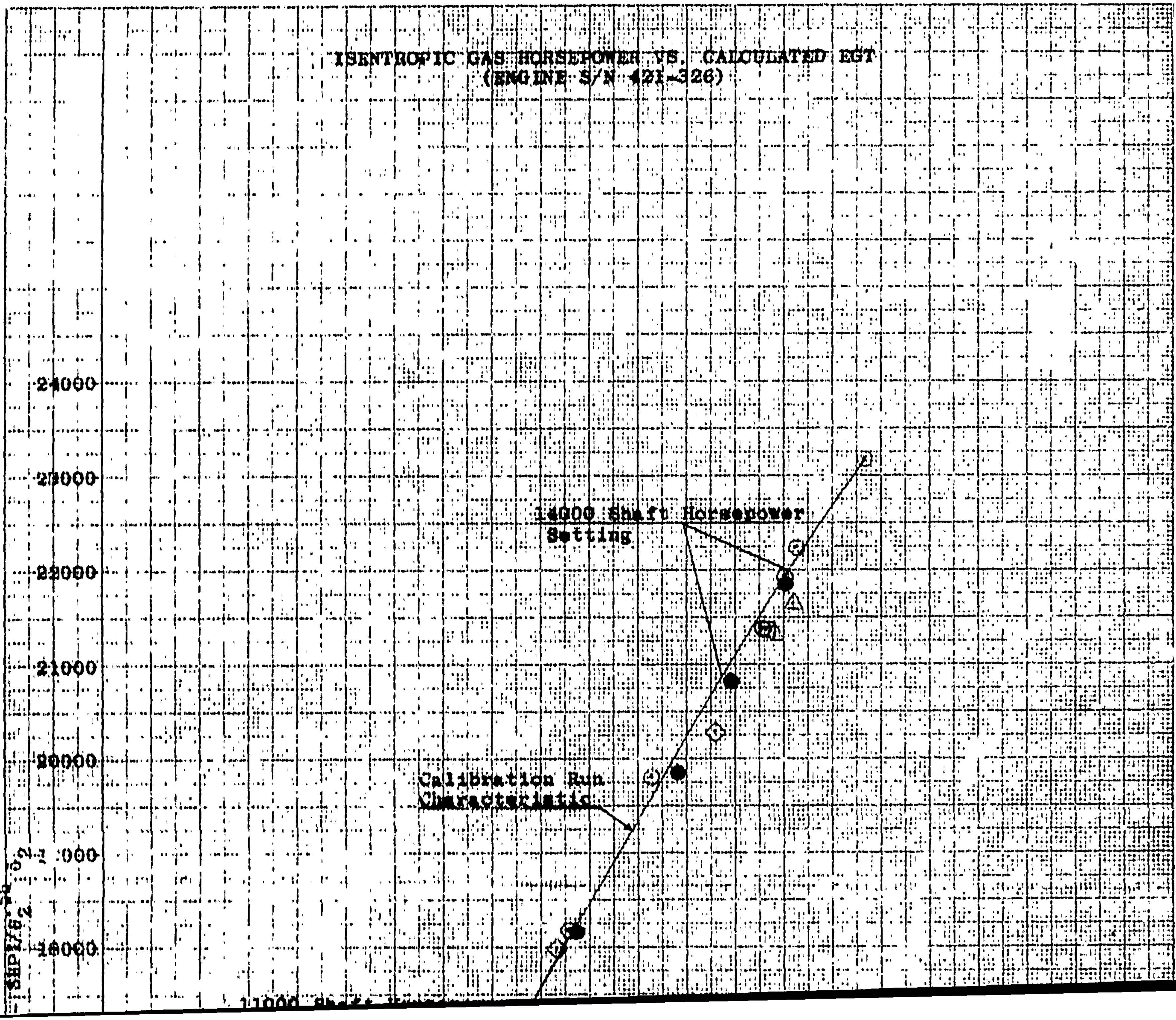
TSA-241-3

FIG. 3.2.2-3



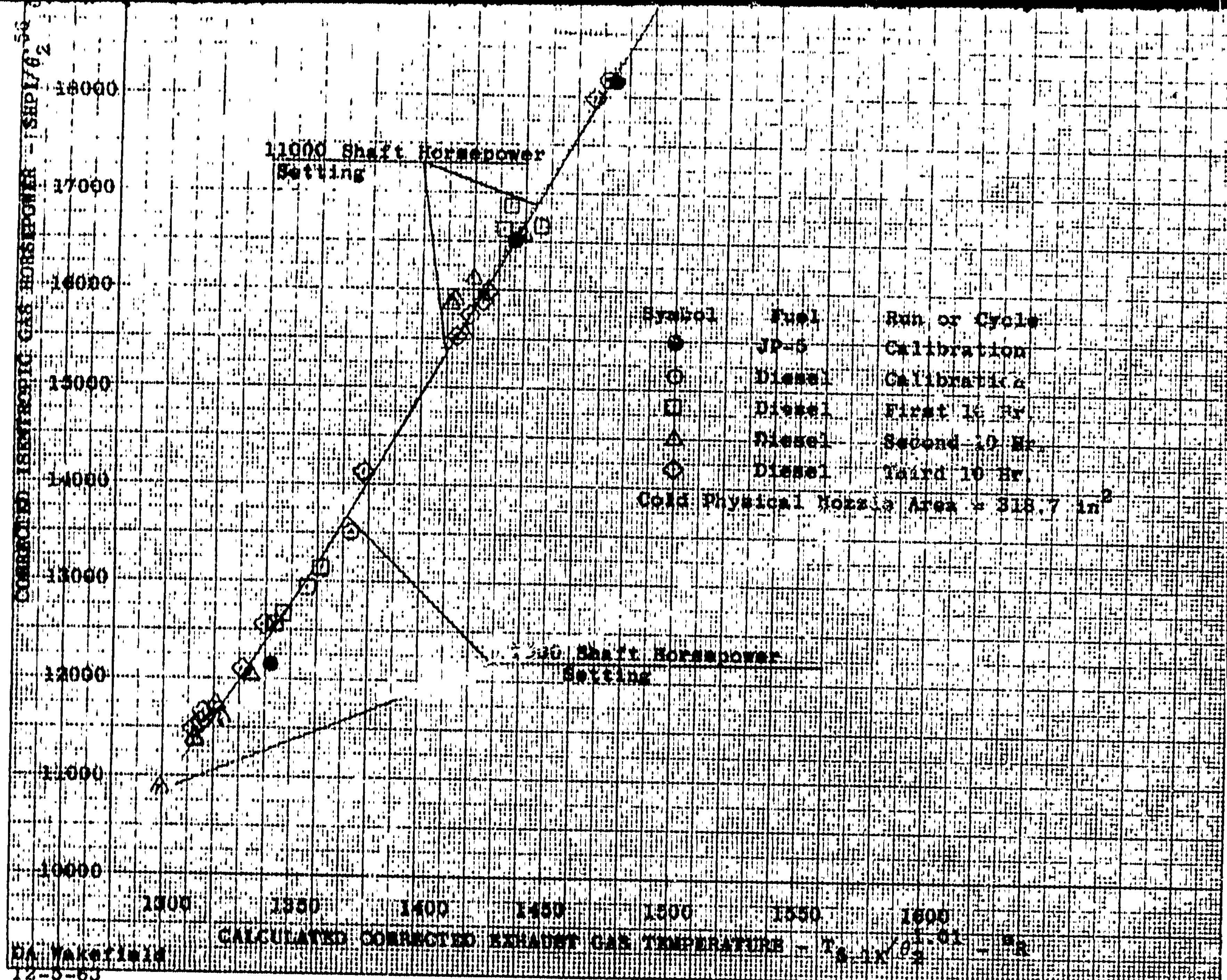
TSA-241-4

FIG. 3.2.2-4



ISENTROPIC GAS HORSEPOWER VS. CALCULATED EGT
(ENGINE S/N 421-326)
24000
23000
22000
21000
20000
18000
14000 Shaft Horsepower
Setting
Calibration Run
Characteristic

A



B

TSA-241-5

FIG. 3.2.2-5

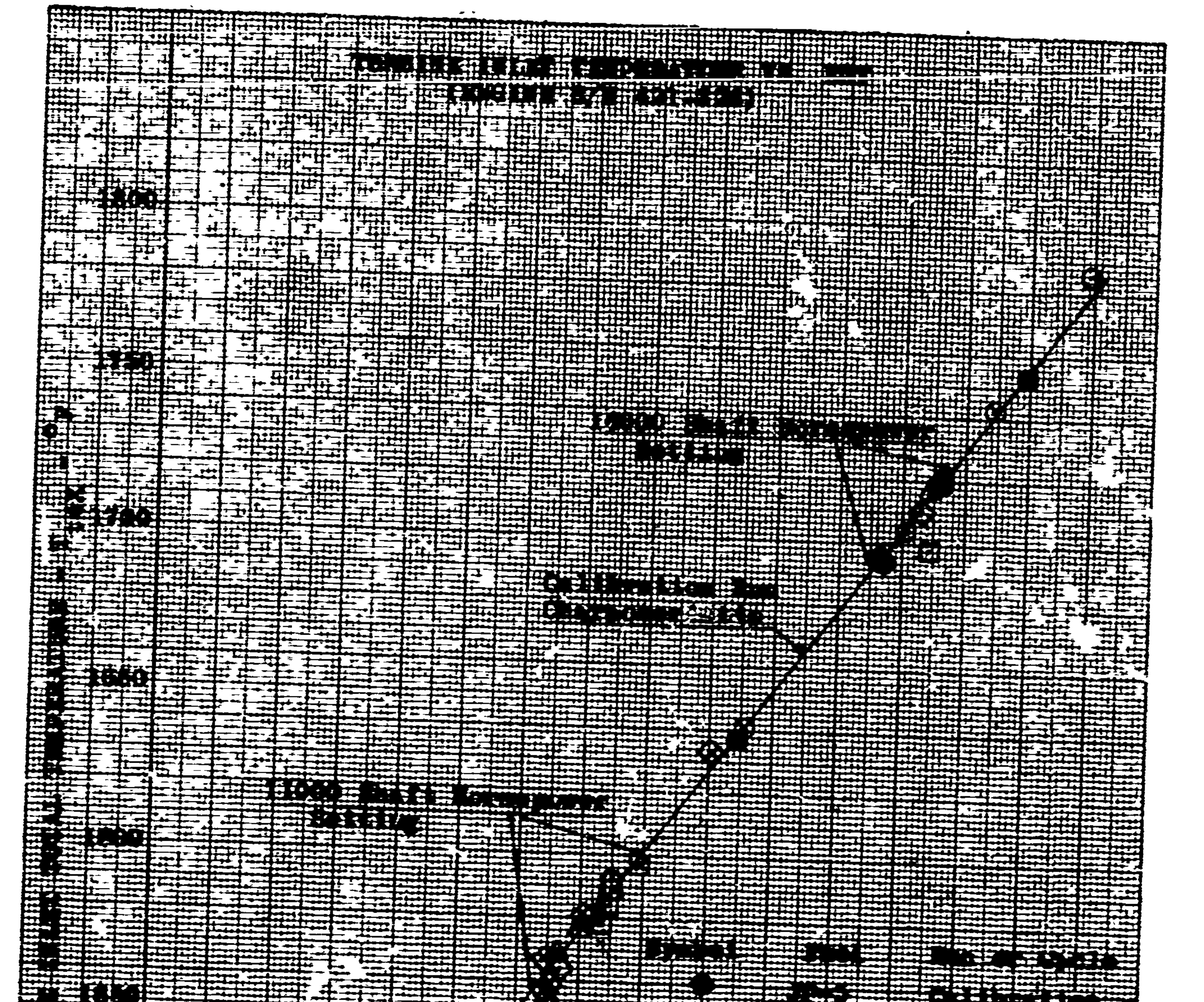


FIG. 3.2.2-6
TSA-241-6

Therefore, the combustion efficiency when using diesel fuel appears to be 0.8% lower than for JP-5 fuel based upon a change of 2.3% in LHV $X\eta_B$ for diesel fuel. This change is shown in Figure 3.2.2-1.

Over the thirty hour endurance run there was approximately 1% deterioration in engine pressure ratio at constant fuel flow for the 14,000 HP point. There was no measurable change in performance at the 11,000 HP and 7,000 HP settings. The 1% deterioration in engine pressure ratio at constant fuel flow at the 14,000 HP setting may be attributed to an apparent loss of approximately 1.25% in turbine efficiency which is partially compensated by a 1.45% decrease in effective turbine nozzle diaphragm area (measured A_{e4} showed a decrease of 1.6% from the beginning to the end of this test). The apparent 1.25% loss in turbine efficiency and 1.45% decrease in A_{e4} are consistent with standard engine derivatives and the performance change at the 14,000 HP setting shown in Figures 3.2.2-2 through -4.

In this range 10°F increase in EGT at constant power is equivalent to 1.7% decrease in power at constant EGT. The 10°F increase in exhaust gas temperature at the 14,000 HP setting is evident from Figure 3.2.2-5. Again there is no measurable change in performance at the 11,000 HP and 7,000 HP settings.

Figure 3.2.2-6 shows the relationship between calculated turbine inlet temperature and exhaust gas temperature. The curve indicates that there was no significant change in the compressor efficiency characteristic throughout the test.

The scatter of data points for the various power settings shown on Figures 3.2.2-1 through -6 is due to the difference in inlet air temperature encountered over the test period and is due to slight changes in the difference between indicated and calculated engine temperatures, which was caused by the turbine inlet temperature profile shift which occurred during the test period. Thus for specified indicated T_5 settings the gas horsepower varied during the test period.

In addition to the required 14,000 HP, 11,000 HP and 7,000 HP power setting points, performance data is shown on Figures 3.2.2-1 thru -6 for additional settings between the 11,000 HP and 14,000 HP settings and two additional settings above the 14,000 HP setting. These additional

settings were required to obtain sufficient data to show effect of burning diesel on engine performance and engine components and to obtain engine characteristics. The settings above 14,000 HP were taken to provide turbine nozzle temperature data for prediction of the nozzle design life and for redesign background.

It should be noted that the conic nozzle simulating the LM1500 power turbine for the Phase I testing was sized based upon the AG(EH) power plant requirements. For Phase II testing, the conic nozzle area will be optimized for the PGM requirements. This will permit a T_4 approximately 60°F lower for the 14,000 HP setting.

In testing a gas generator, isentropic gas horsepower is the only power parameter which can be calculated; however, the following conversion factors may be used to approximate the equivalent shaft horsepower for the condition defined.

SHP	Power Turbine Speed - RPM	SHP Conversion Factor: 0% Humidity (At 100°F Amb)	SHP Conversion Factor: 100% Humidity (At 100°F Amb)
14000	5500	.802	.813
11000	5030	.779	.790
7000	4350	.758	.770

The data presented in curves TSA 3.2.2-3 and -5 are corrected to a 59°F ambient day at sea level with 0% relative humidity and must be adjusted for different ambient temperatures. The final conversion form is as follows:

$$SHP_{T2,\ Rel.\ Hum.} = \text{Isentropic Gas HP}\ (SHP_{\text{Conversion Factor}}) \times \left(\frac{518.7}{T_2\,°F + 460}\right)^{.56}$$

3.3 Combustion Liner Temperature

Present estimated

This test shows that there was an increase in the liner skin temperatures when diesel fuel was used in place of JP-5. This difference was as much as 50 degrees for the inner liner front, midsection and rear temperatures. This increase in level could shorten the life of this J79-8/15 liner which has the majority of its problems in the inner liner region. The Phase III 500 hour endurance test will be necessary before a good estimate can be made of the life with diesel fuel and a marine atmosphere.

The temperatures of liner #10 were about 100° higher than those of ignition liner #4. Since liner #4 had a P6 nozzle and liner #10 a P5 it was suspected that the nozzle was effecting the skin temperatures. To check this, the nozzles were switched between liner #10 and #4. This did not change the difference in temperatures showing that the fuel nozzle type was not significant. This difference in temperature level must be attributed to an uneven circumferential air flow distribution from the compressor. There was insufficient instrumentation to verify the uneven compressor airflow distribution.

Although the overall average skin temperature for diesel was higher than that for JP-5, the temperatures from certain regions of the liners were compared to get a better comparison. The regions that were picked for comparison were as follows:

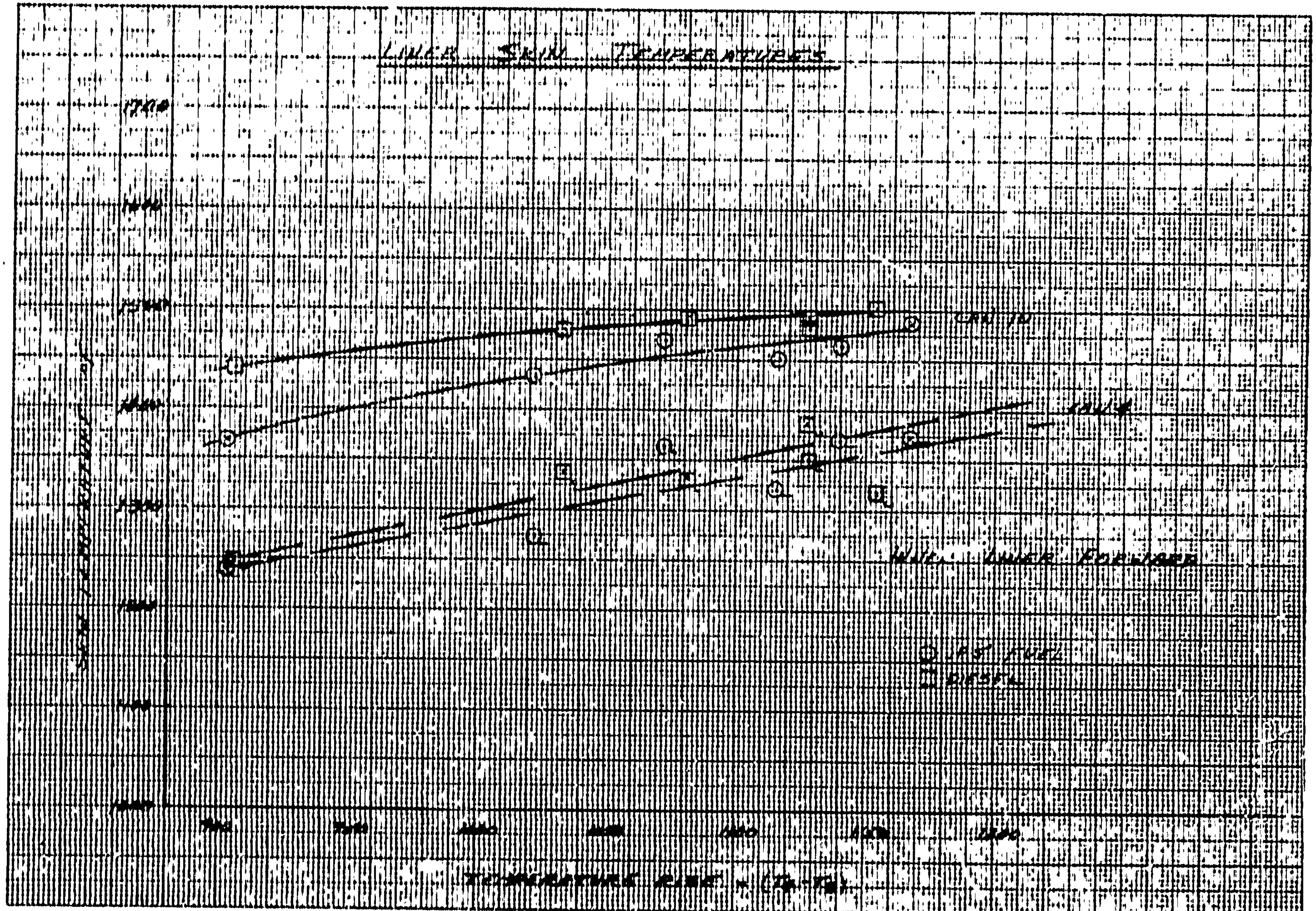
*1. Inner liner - forward
*2. Inner liner - mid region
*3. Side of cross fire eyelet forward of shear slot
*4. Side of cross fire eyelet aft of shear slot
*5. Directly behind cross fire eyelet
*6. Z-Ring - behind cross fire eyelets
*7. Z-Ring between cross fire eyelets
*8. Rear liner

*Numbers refer to thermocouple locations on Figures 2.3.-1 and -2.

Was this verified?

The results of the skin temperature investigations are shown in Figures 3.3.-1 thru -8. There is some scatter and variation between results for the two cans because of burned out thermocouples and carbon deposition, but, in general, both cans tell the same story. Results show that as $T_4 - T_3$ increases the skin temperatures increase. The slope of this line is the same for most regions and the difference due to using diesel fuel is greater at the higher temperature rises. The exception is in the front of the inner liner. Here the slope is less severe and the difference between JP-5 and diesel is greatest at the lower $T_4 - T_3$. This is probably due to the flame front movement with $T_4 - T_3$. It was discovered on previous combustion liner investigations that at low $T_4 - T_3$ values the flame was in the dome region and moved downstream with increasing $T_4 - T_3$. As $T_4 - T_3$ increases the flame front moves downstream from the dome causing less increase in dome skin temperature than in the liner mid or aft region skin temperatures.

The inner liner rear temperatures (both those in line and not in line with cross fire tubes) and mid section temperatures are of the same general level and characteristic. These skin



12/x/63

FIGURE 3.3-1

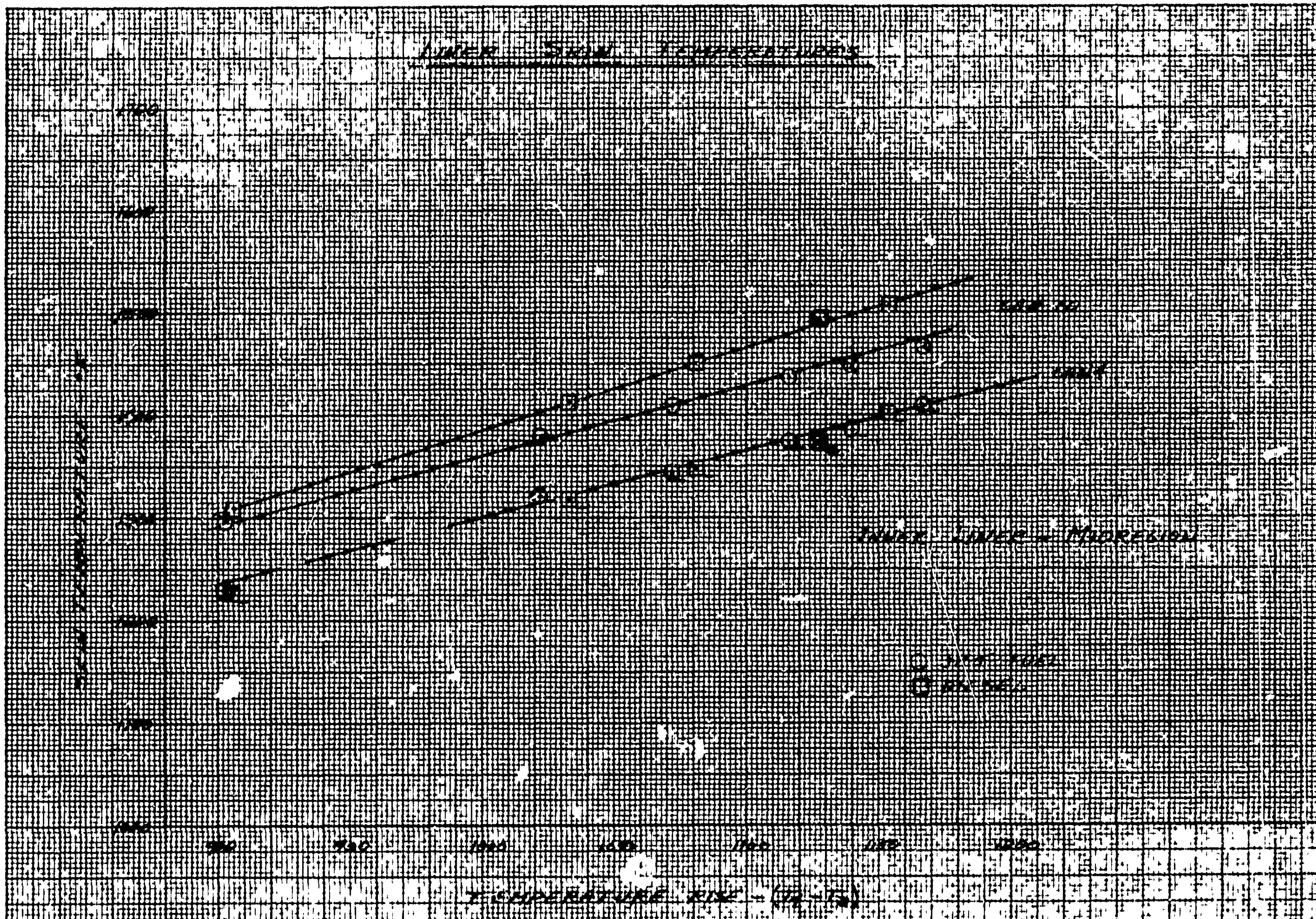
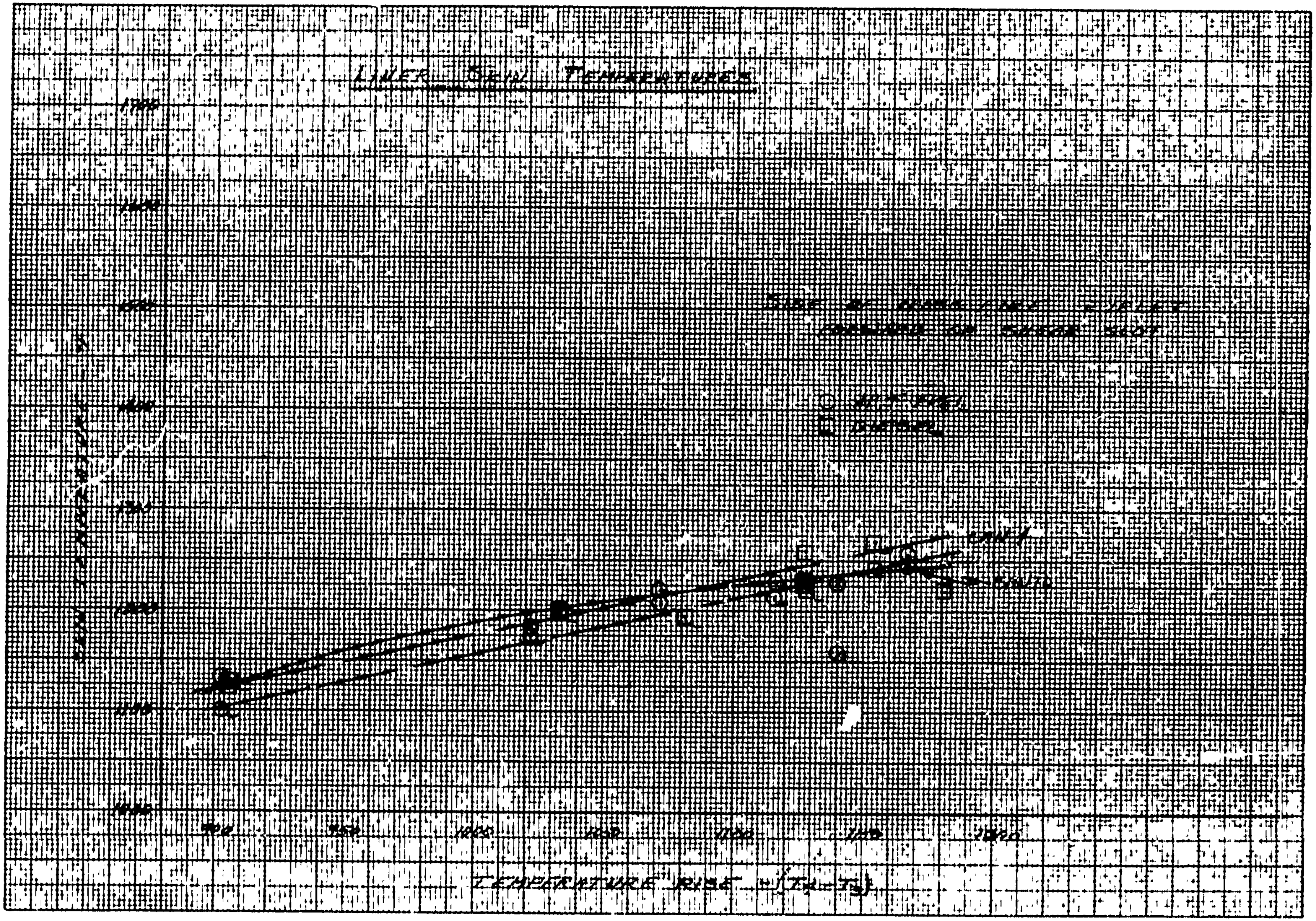


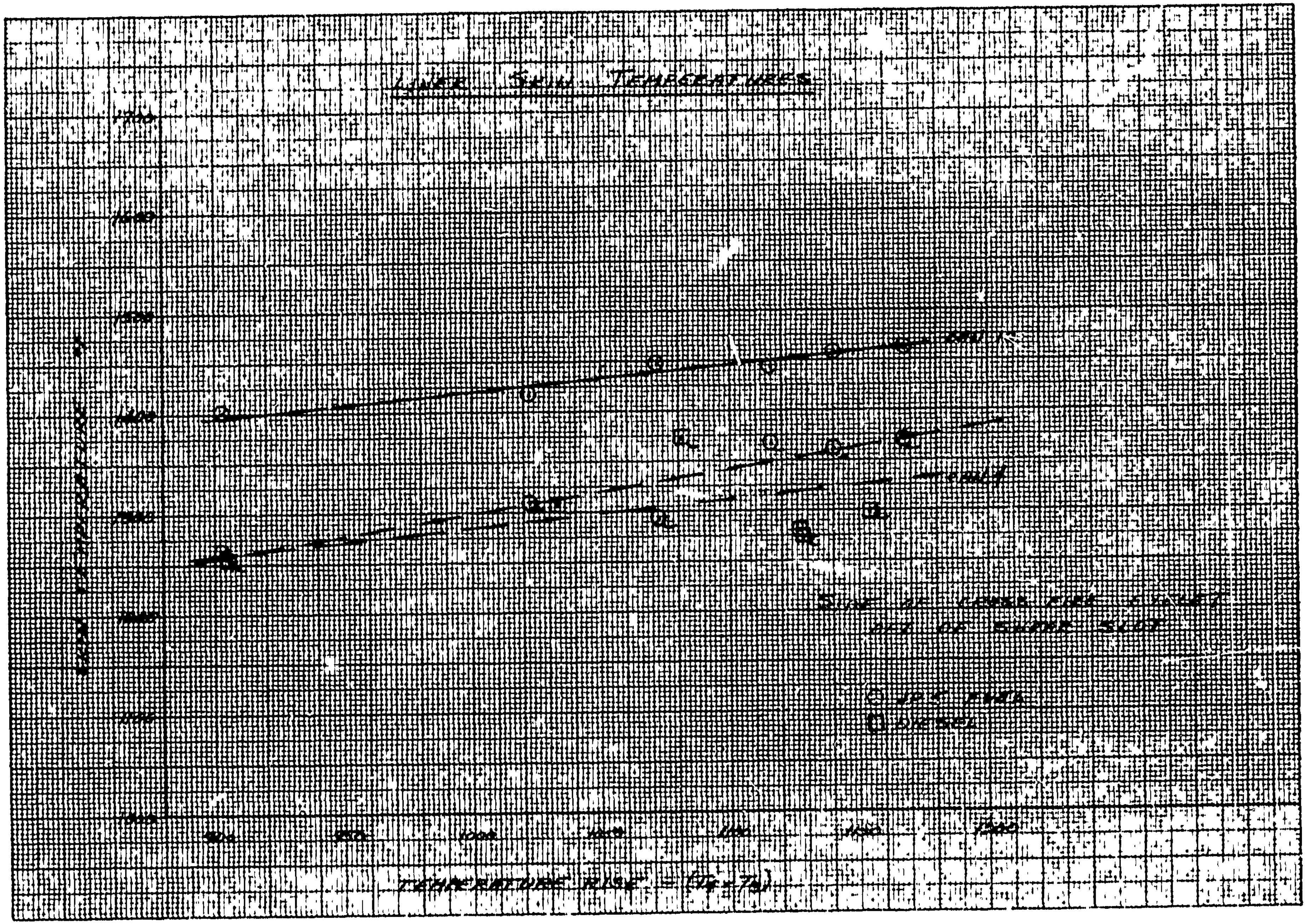
FIGURE 33-2

12/2/63
EL



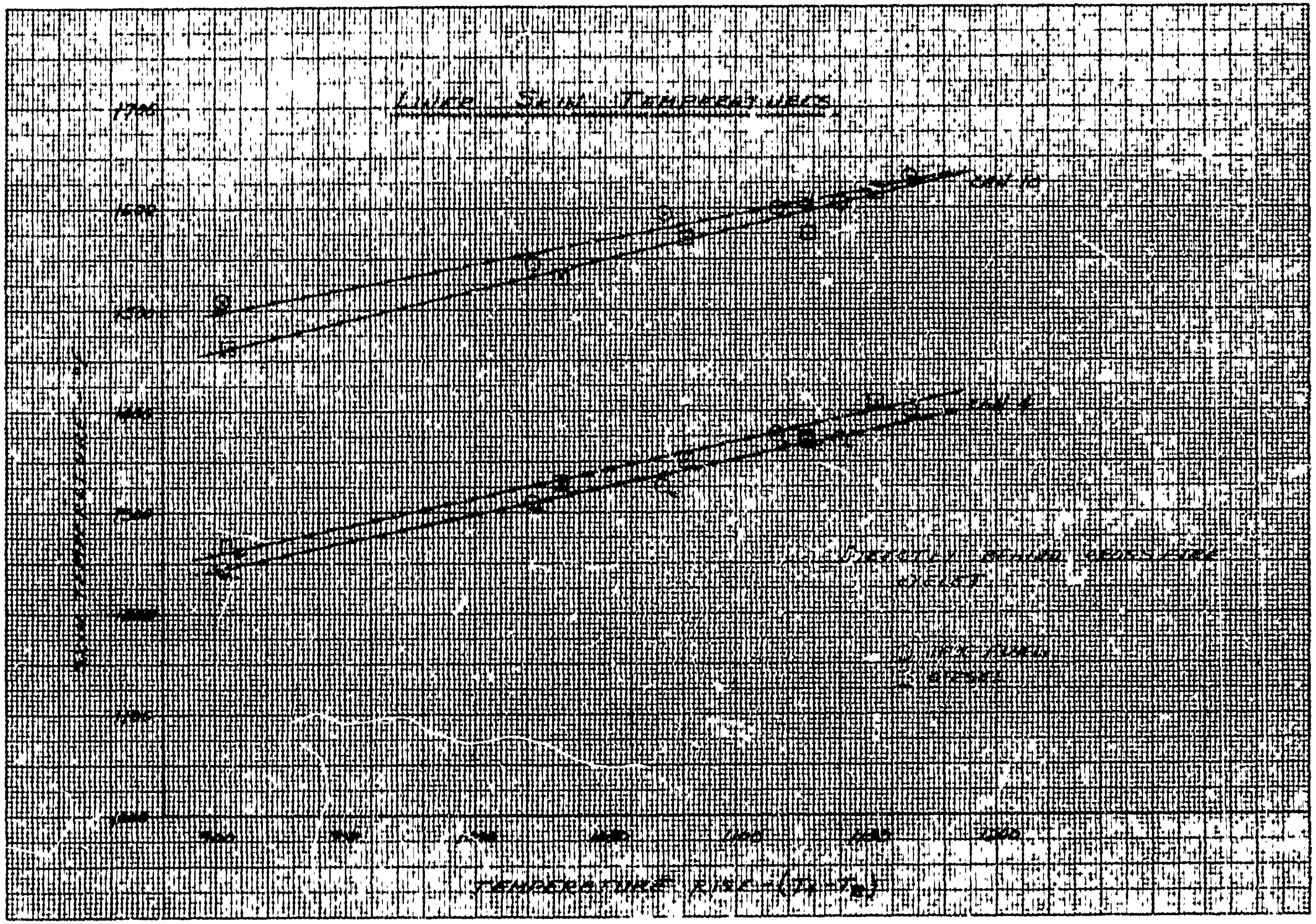
12/2 63
EL

FIGURE 3.3-3



12/2/63
dc

FIGURE 33-4



12/2/63
EL

FIGURE 3.3-5

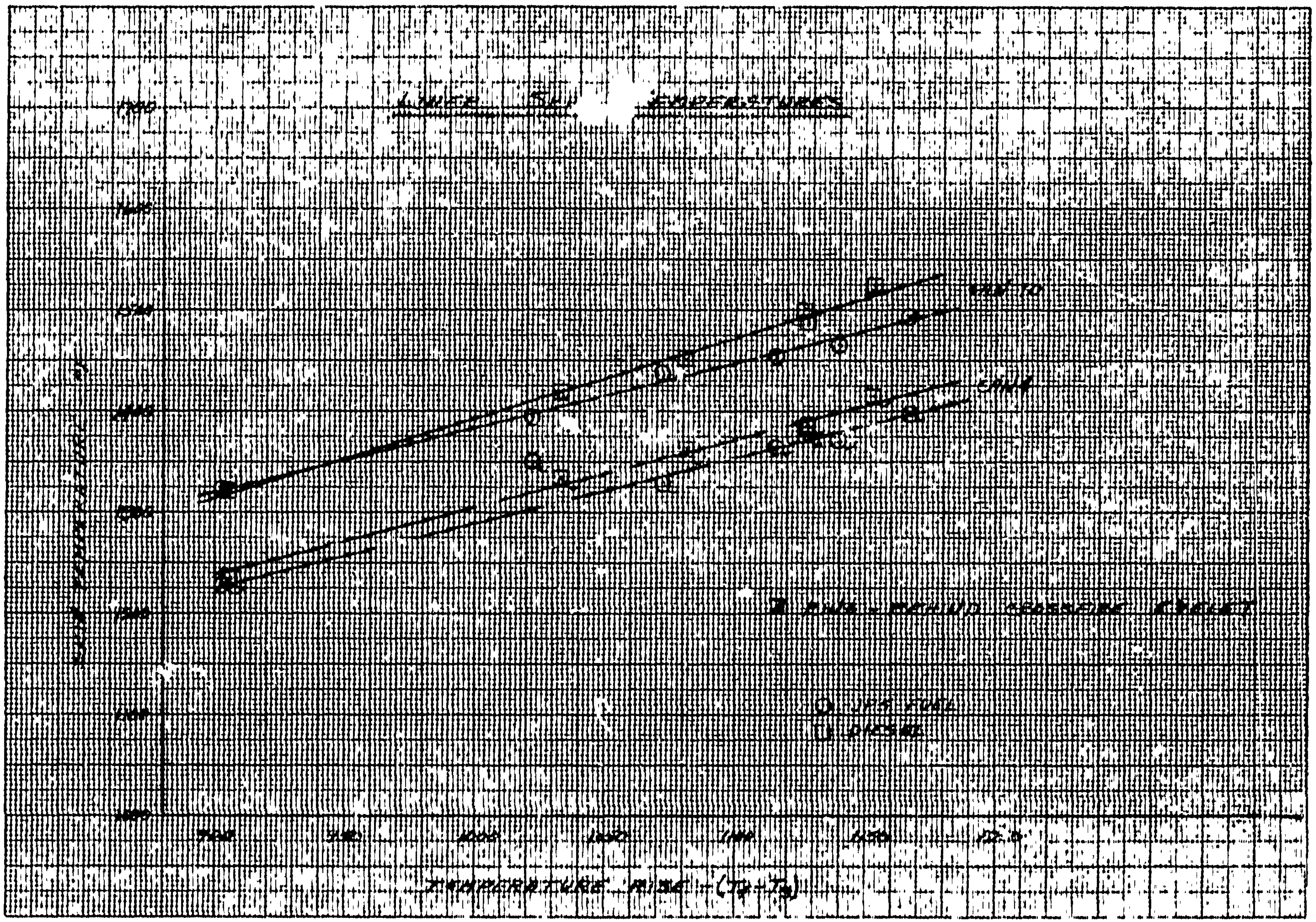


FIGURE 3.2-6

12/24/63
EL

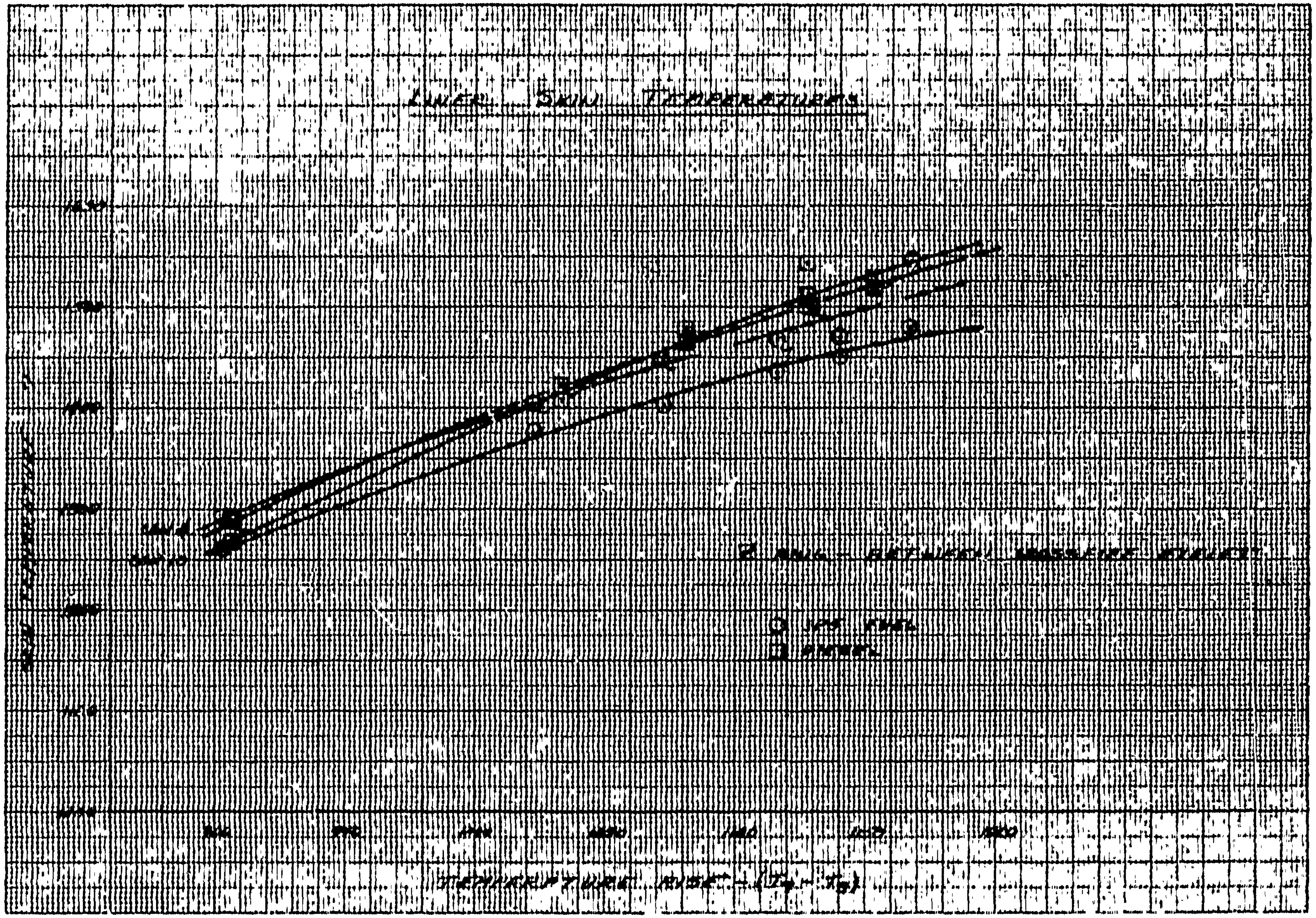


FIGURE 3.3-7

12/2/63

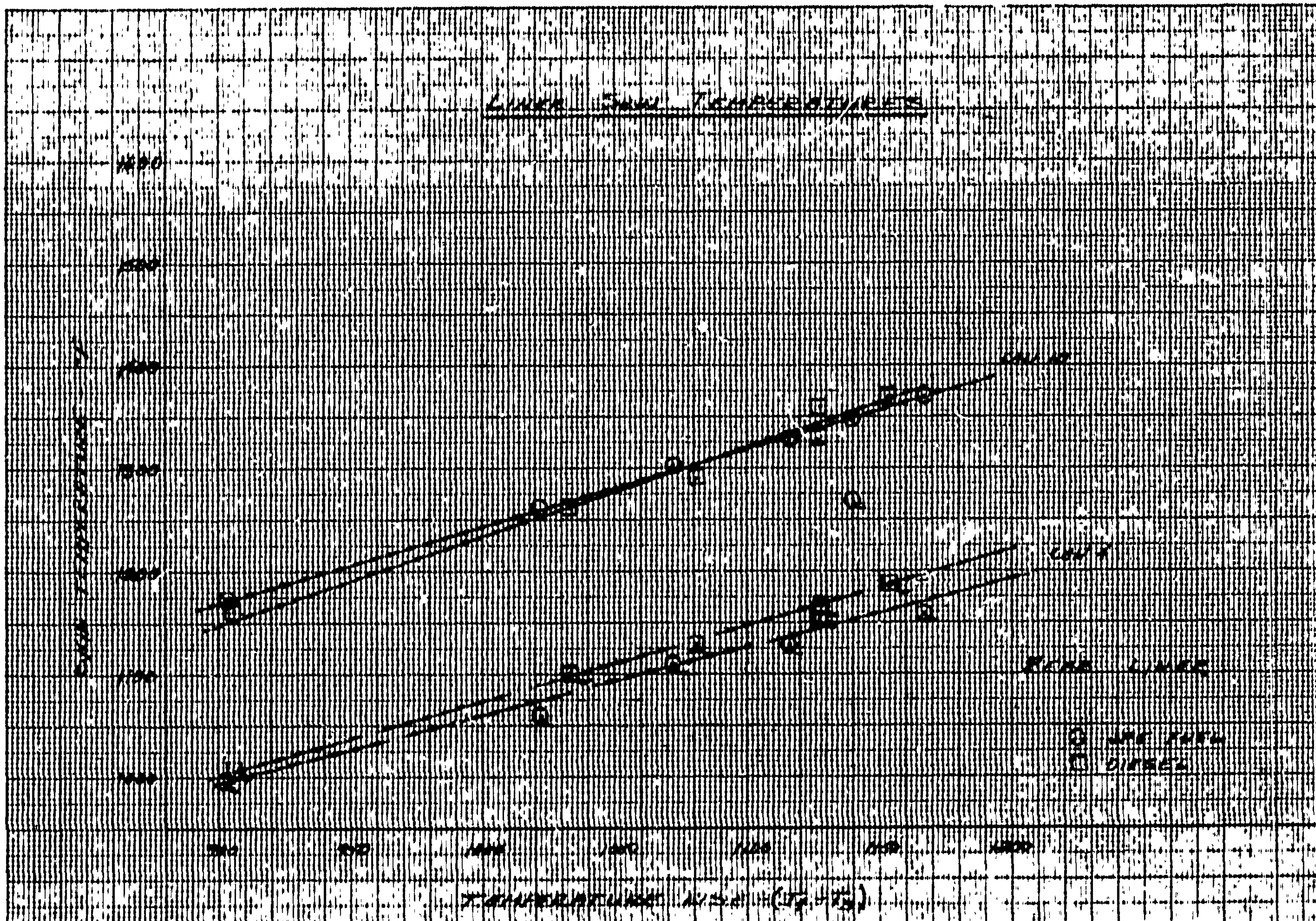


FIGURE 33

temperatures with diesel fuel were up to 50° hotter than with JP-5. The inner liner front temperatures with diesel fuel also ran up to 50° hotter than with JP-5. The temperature near the cross fire tubes did not show as much of a difference in level due to the fuel type. The hottest of the temperatures noted in this test were in line with and behind the cross fire tube. The coolest temperatures were those at the side of the cross fire tubes in front of the shear slot. Those at the sides of the cross fire tubes but behind the shear slots ran at the same levels as the inner liner mid section temperatures. Refer to Figure 3.3-1 thru -8.

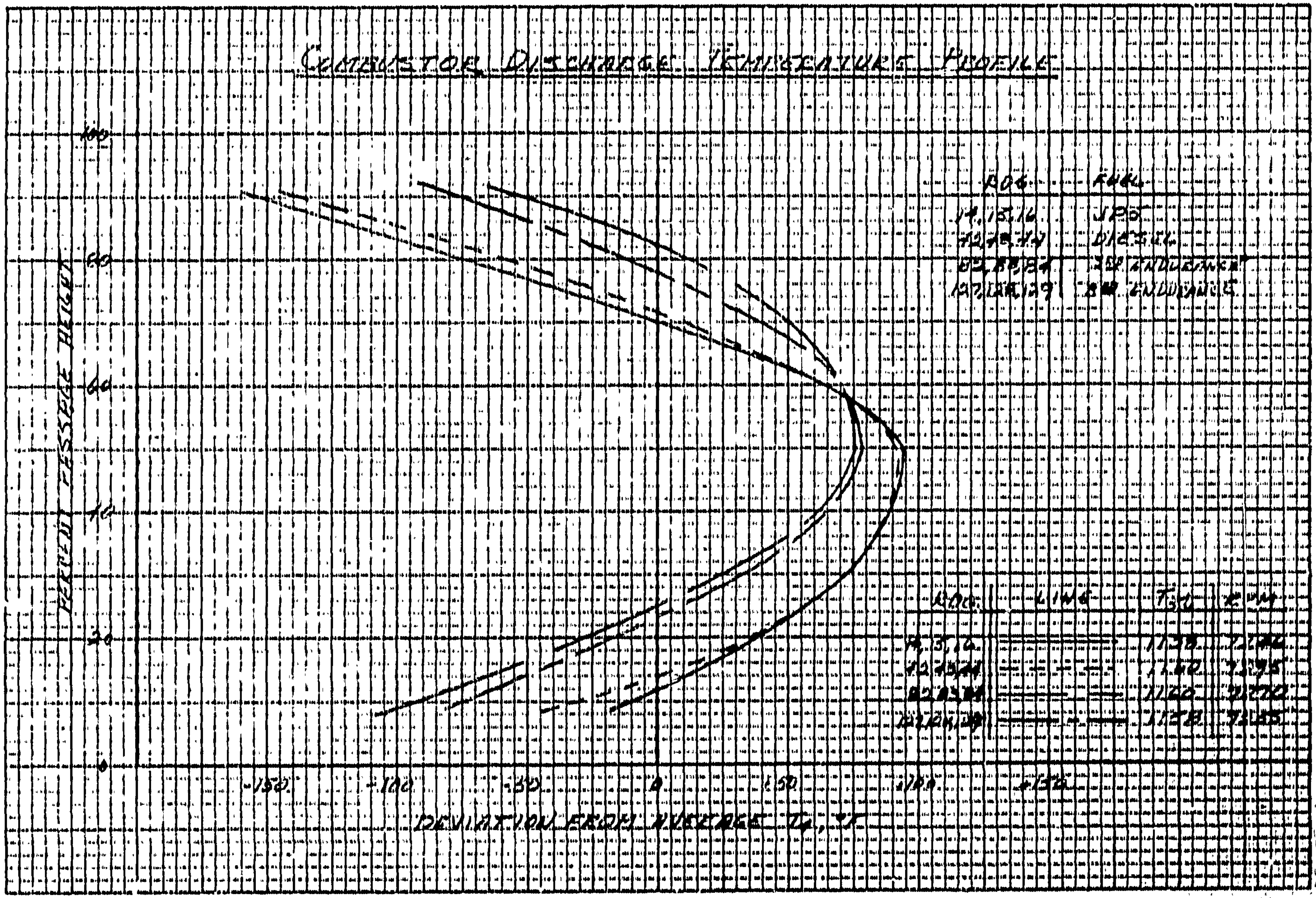
3.4 Turbine Inlet Temperature

No change in turbine inlet temperature profile occurred as a result of using the diesel fuel when compared directly to the JP-5 fuel run as shown on Figure 3.4-1. These profiles were obtained by averaging all thermocouples of constant immersion. Included on this figure also was the results of running during the second and third ten hour endurance cycles. Data for the first endurance run was not included due to equipment difficulties, refer Section 2.3. It was readily apparent that an upward shift occurred in the profile and appeared to be a gradual change with running time. The initial profiles were concentrated closer to the hub (inner band) of the first stage turbine nozzle. The later profiles are indicative of the expected profile. As a result of this shift and the limited gas path area being covered, the measured average temperature also changed and decreased in magnitude with time. Over the thirty hour endurance cycle a decrease of approximately 20°F was noted.

A plot of compressor discharge profiles for these same points shows an interesting trend. See Figure 3.4.-2. The profiles for the second and third endurance runs are different from those of the JP-5 and diesel bench mark runs. This shift in profile is such that for the latter runs there were higher velocities near the inner wall and lower velocities near the outer wall than in the early runs. This could be expected to cool off the inner part of the profile and raise the temperature of the outer part for the latter runs. This corresponds very well with the changes that actually took place in the profiles.

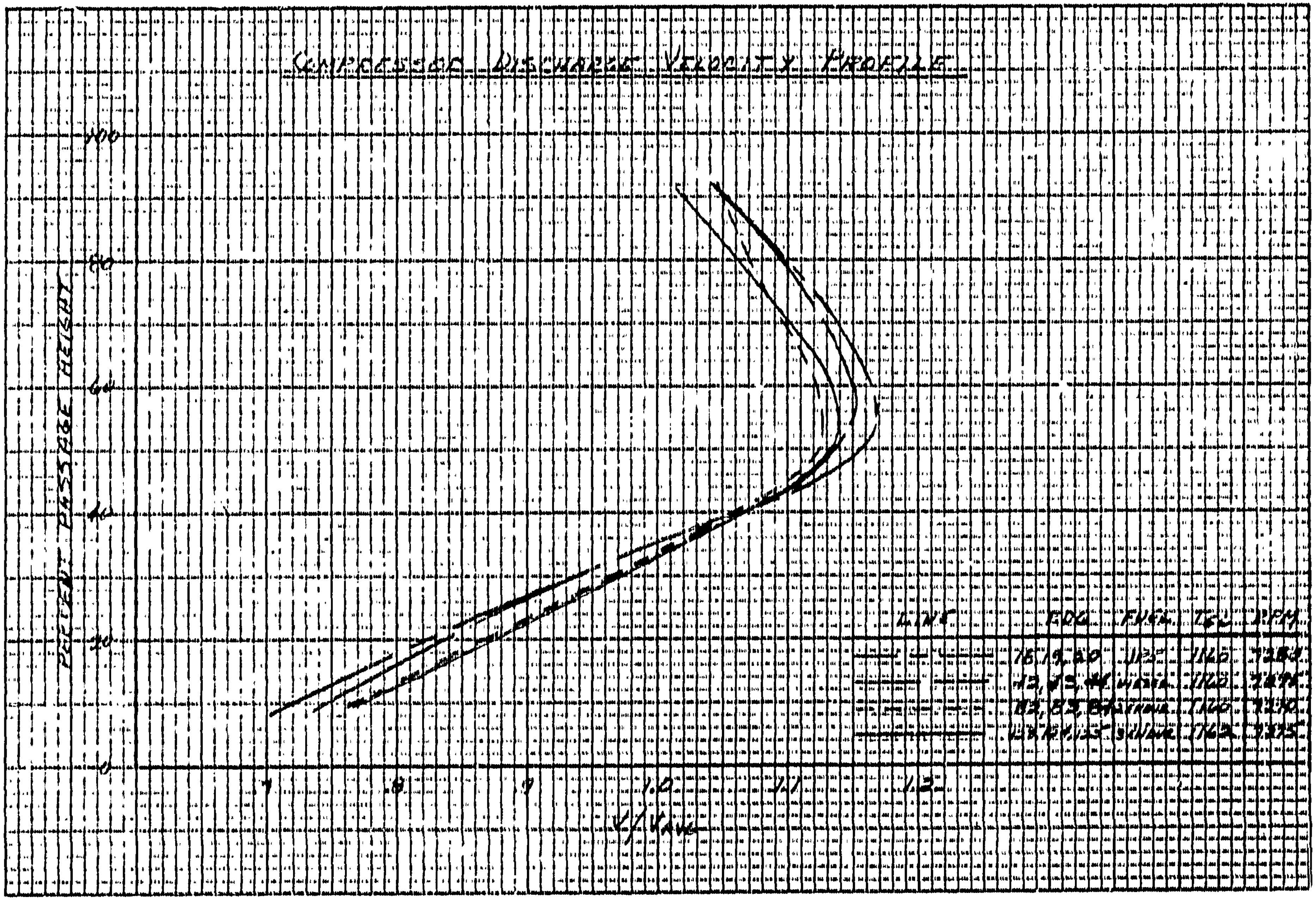
Pattern factor which is another method of presenting the peak temperatures also shows that there was no significant difference in the JP-5 or diesel operation. Pattern factor is defined as

$$P.F. = \frac{T_4\ Peak - T_4\ avg}{T_4\ Peak - T_3\ avg}$$



11/14/63
EL

FIGURE 3A-10



11/14/63

FIGURE 34-2

On Figure 3.4.-3 is shown a comparison of the JP-5 and diesel run pattern factors and those for the second and third endurance cycles. Although a low pattern factor is desireable as an indication of low peak turbine inlet temperatures, it is significant that the pattern factor variation between JP-5 and diesel operation and during the diesel endurance running is within the pattern factor tolerance. This indicates that the pattern factor did not deteriorate during the endurance running.

3.5 First Stage Turbine Nozzle

Phase I of the Marinization Program required measurement of stage 1 turbine nozzle, temperatures during a 30 hour test of a J79-8 engine burning MIL-F-16884D diesel fuel of poor quality and analysis of the data obtained for the critical areas of the stage 1 turbine nozzle data. This includes the vane leading and trailing edges and the inner band in the area of the vane trailing edges.

Vane operating temperatures can be summarized by saying that the average vane behind a combustion can may run somewhat cooler with diesel fuel than with JP-5. This is true of both the vane leading and trailing edges although the effect was more pronounced on the leading. Leading edge temperatures were approximately 30°F (± 50°F) lower with diesel, refer Figure 3.5-1 thru -9 and trailing edge temperatures were approximately 15°F (± 50°F lower. Refer to Figure 3.5-10 thru -20.

Figure 3.5-38 thru -43 indicate the cooling air flow through the partitions was cooler with diesel fuel than with JP-5. This may be indicative of increased cooling mass flow or a lower temperature partition. Compressor pressure ratio at constant engine airflow gradually increased with endurance running time. At the completion of the test an increase of 2% in compressor discharge pressure was noted. As a result of this pressure level increase the cooling mass flow would also contribute to reduced partition temperature. Based on this, the difference in partition temperature was considered to be a result of changing fuel rather than a change in cooling flow rate or effectiveness.

It should be pointed out, however, that average measured T_4 values for diesel runs were lower than for JP-5 runs having about the same calculated uncorrected T_4 values. Why?

For Example:

Fuel	Rig. No.	RPM	Meas. T_2	Meas. T_3	Calc. Uncor. T_5	Meas. AVG T_5	Calc. Uncor. T_4	Meas. AVG T_4	Meas. Max. T_4	AVG Vane L.E.	AVG Vane T.E.	AVG I.B. T.E.
JP-5	18	7280	78.0	718	1133	1160	1706	1858	2336	1621	1754	1444
Diesel	38	7280	69.0	705	1121	1135	1704	1833	2303	1579	1725	1402
JP-5	22	7330	78.5	728	1159	1187	1740	1895	2404	1638	1773	1464
Diesel	45	7340	75.0	724	1149	1185	1743	1878	2257	1606	1756	1461

FIGURE 3.4-3

JP5 Rdg. No.	JP5 T_{51} °F	JP5 Pattern Factor	Diesel Rdg No.	Diesel T_{51} °F	Diesel Pattern Factor	Diesel Rdg No.	Diesel Hours	Diesel T_{51} °F	Diesel Pattern Factor	Diesel Rdg No.	Diesel Hrs	Diesel T_{51} °F	Diesel Pattern Factor
2	920	.238	26	920	.263	106	21.23	918	.331	155	26.33	920	.349
						120	25.41	919	.381	167	29.75	919	.397
6	1050	.296	30	1050	.310	89	16.48	1050	.325	133	21.58	1050	.272
						103	20.53	1051	.321	146	25.25	1052	.312
10	1095	.333	34	1100	.416								
14	1138	.398	38	1135	.416								
18	1160	.420	42	1160	.397	82	15.43	1160	.275	123	20.25	1162	.338
						86	16.13	1165	.296	127	20.75	1158	.321
22	1187	.437	45	1185	.328								

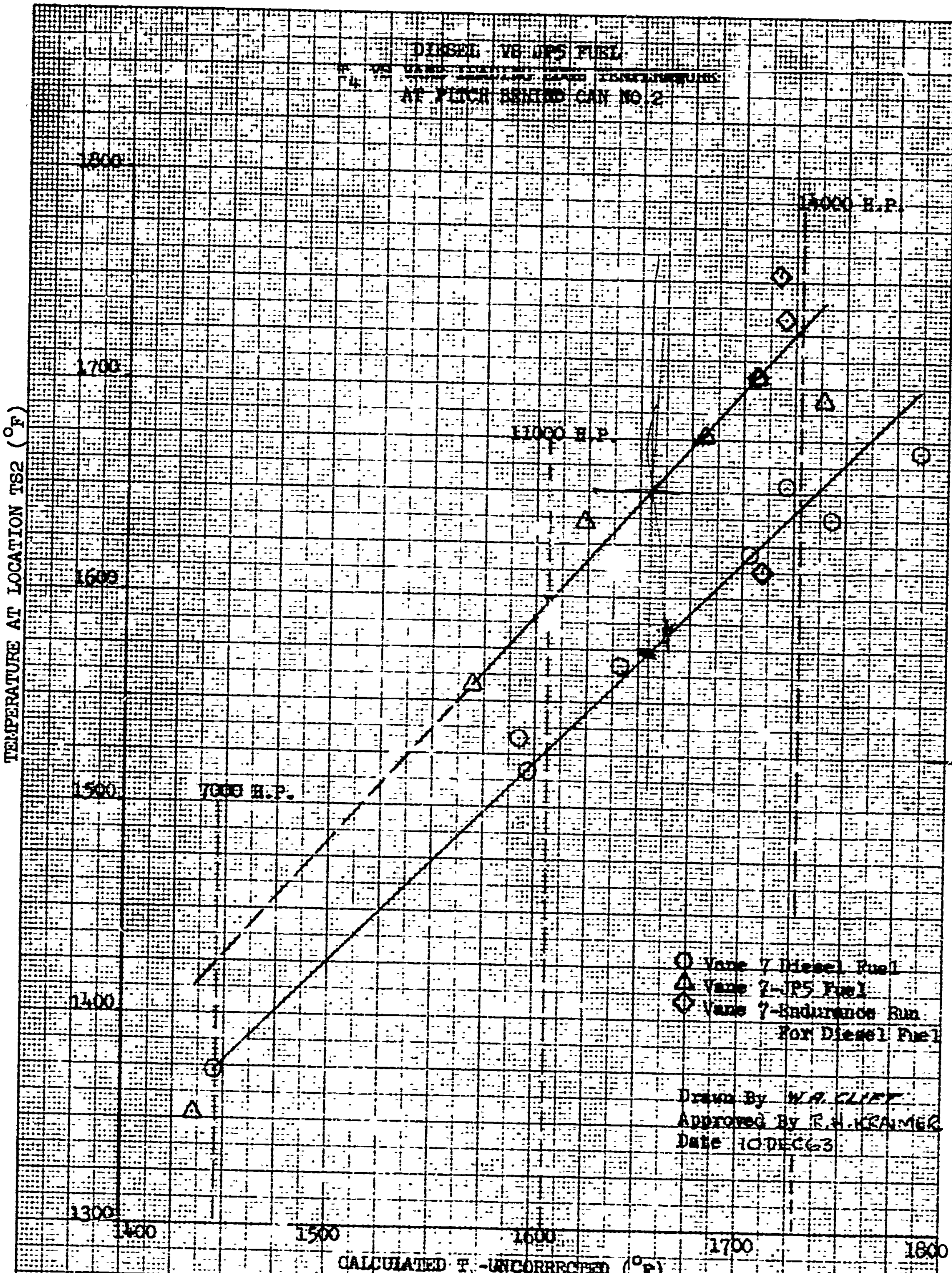


FIGURE NO. 3.5-1

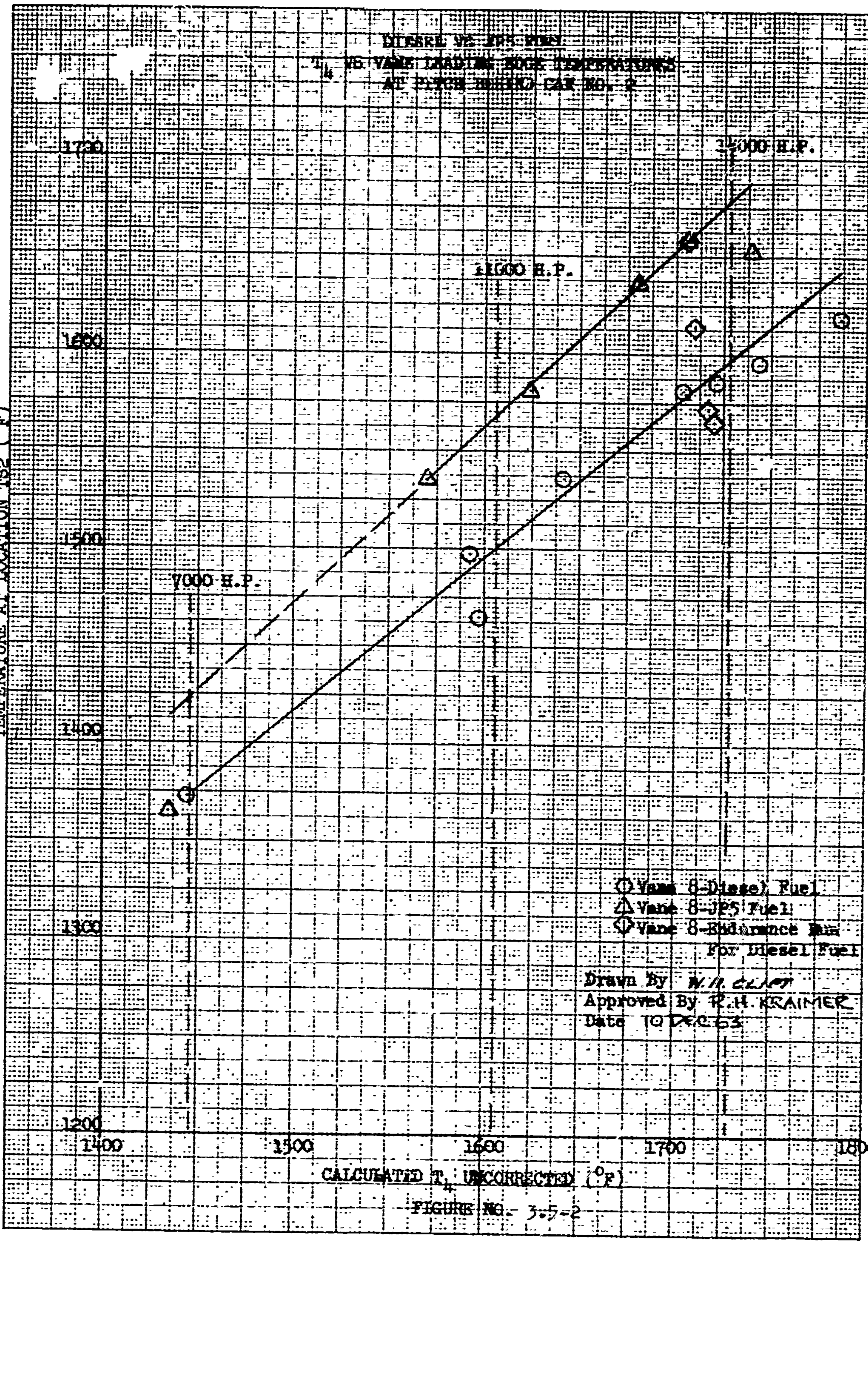


FIGURE NO. 3.5-2

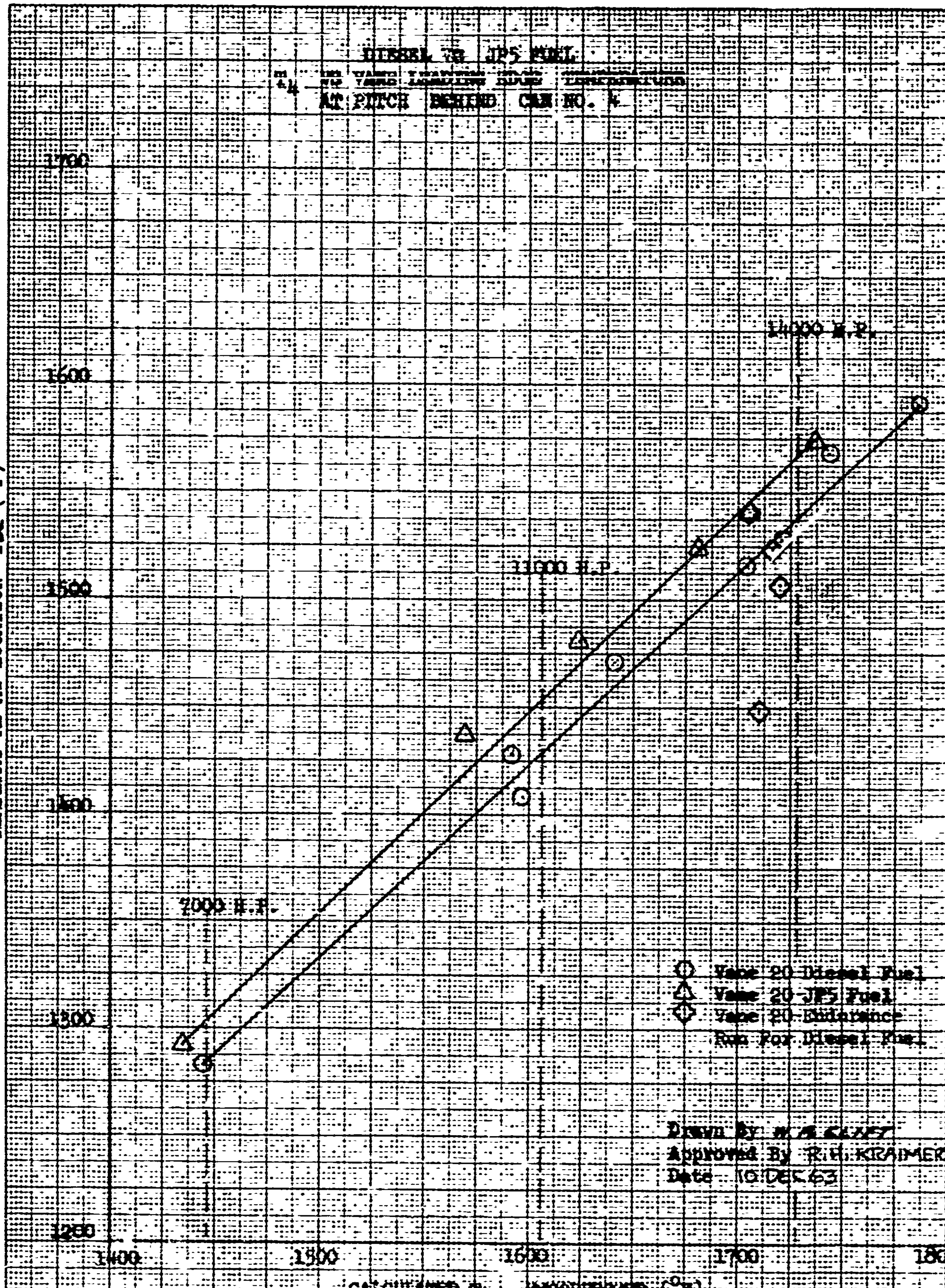


FIGURE NO. 3.5-3

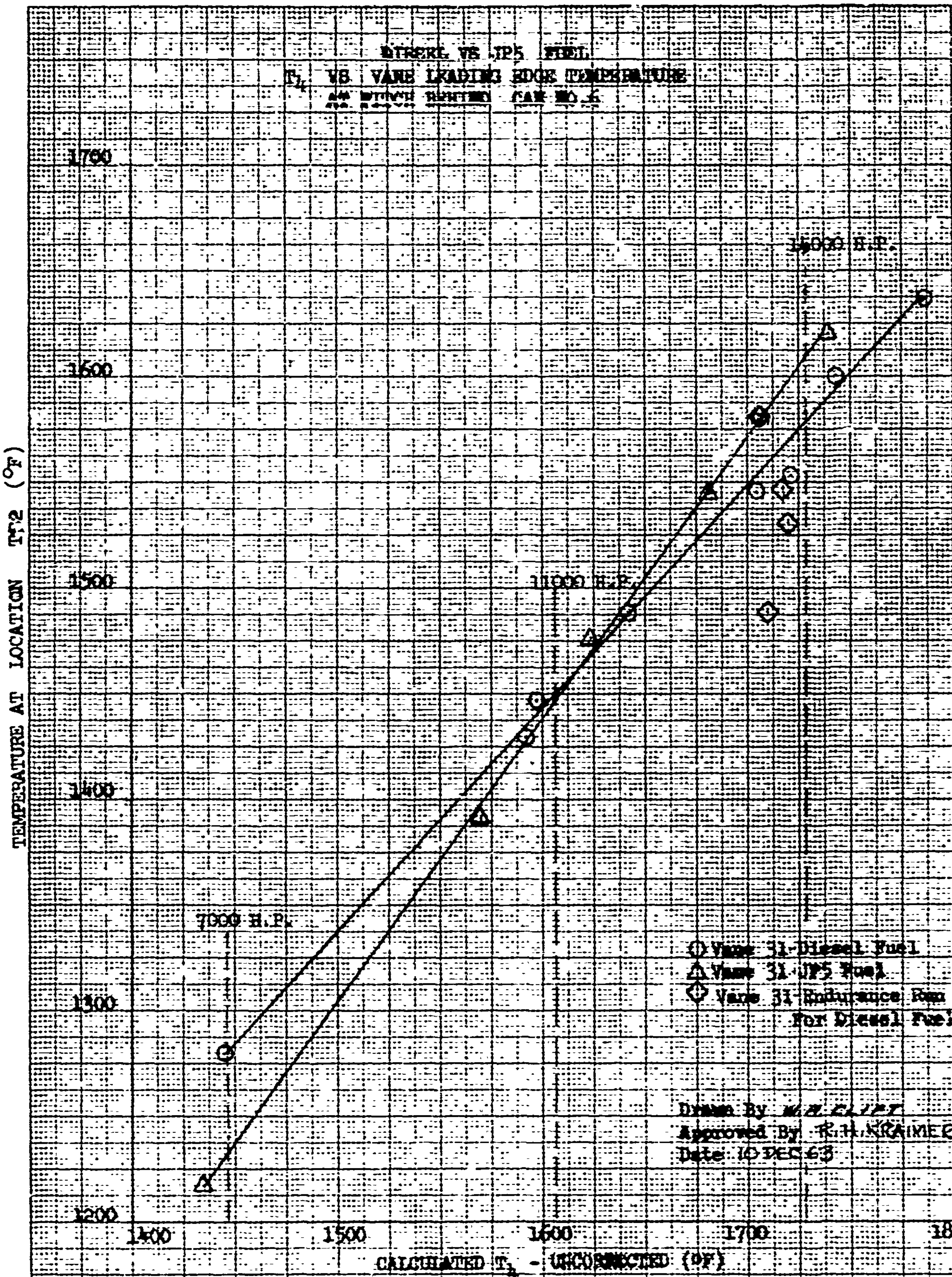


FIGURE NO. 3-5-4

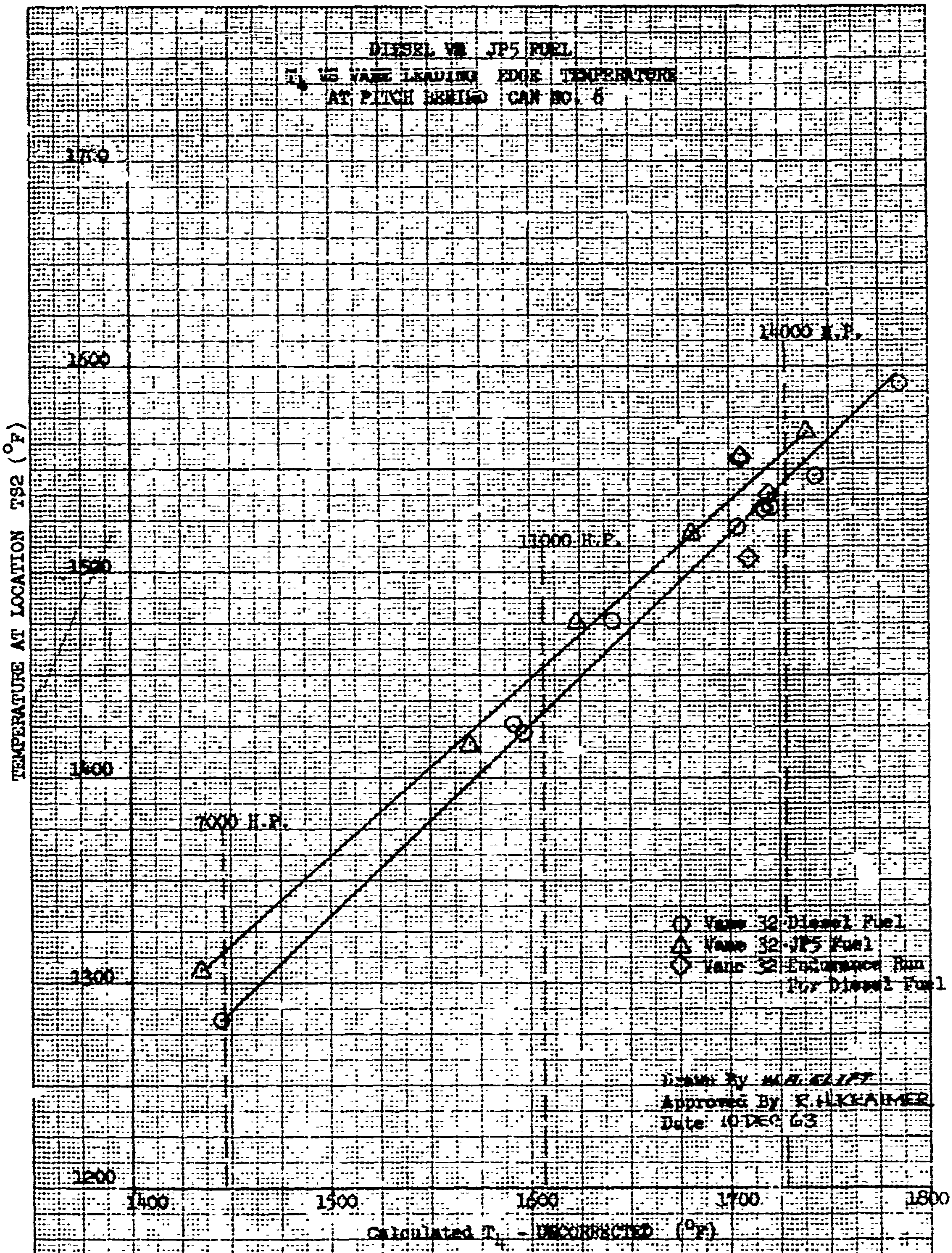


FIGURE NO. 3.5-5

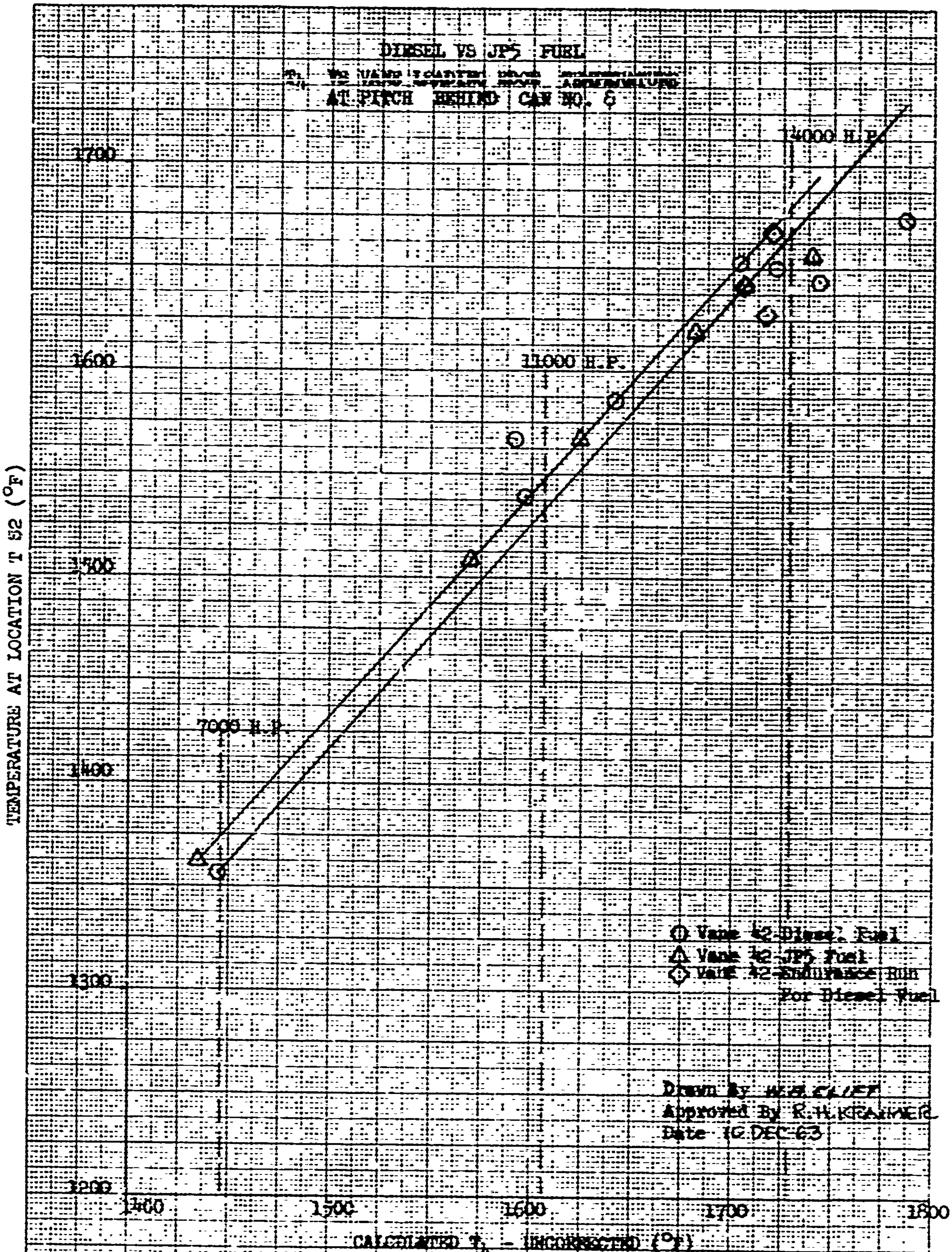


FIGURE NO. 3.5-6

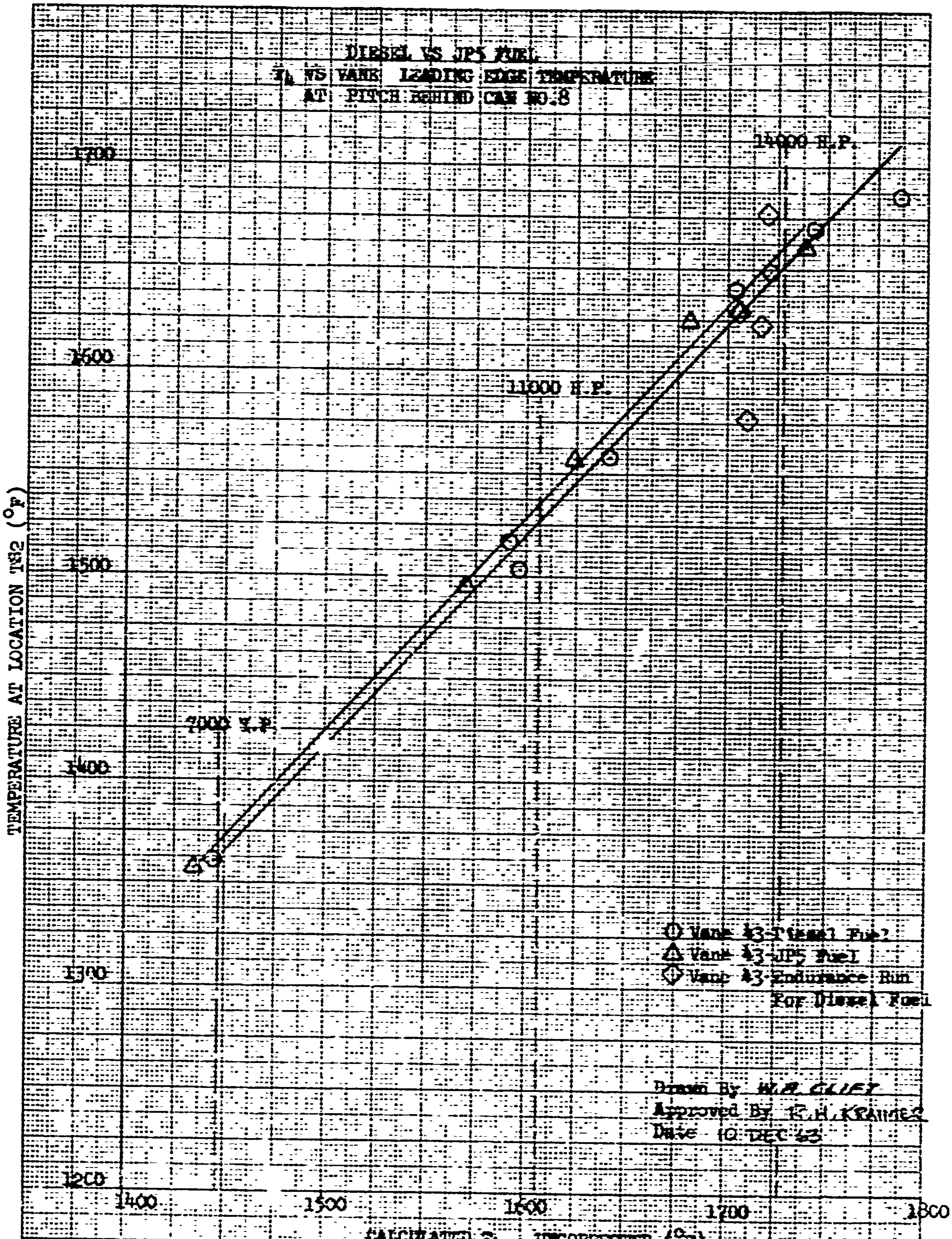


FIGURE NO. 3.5-7

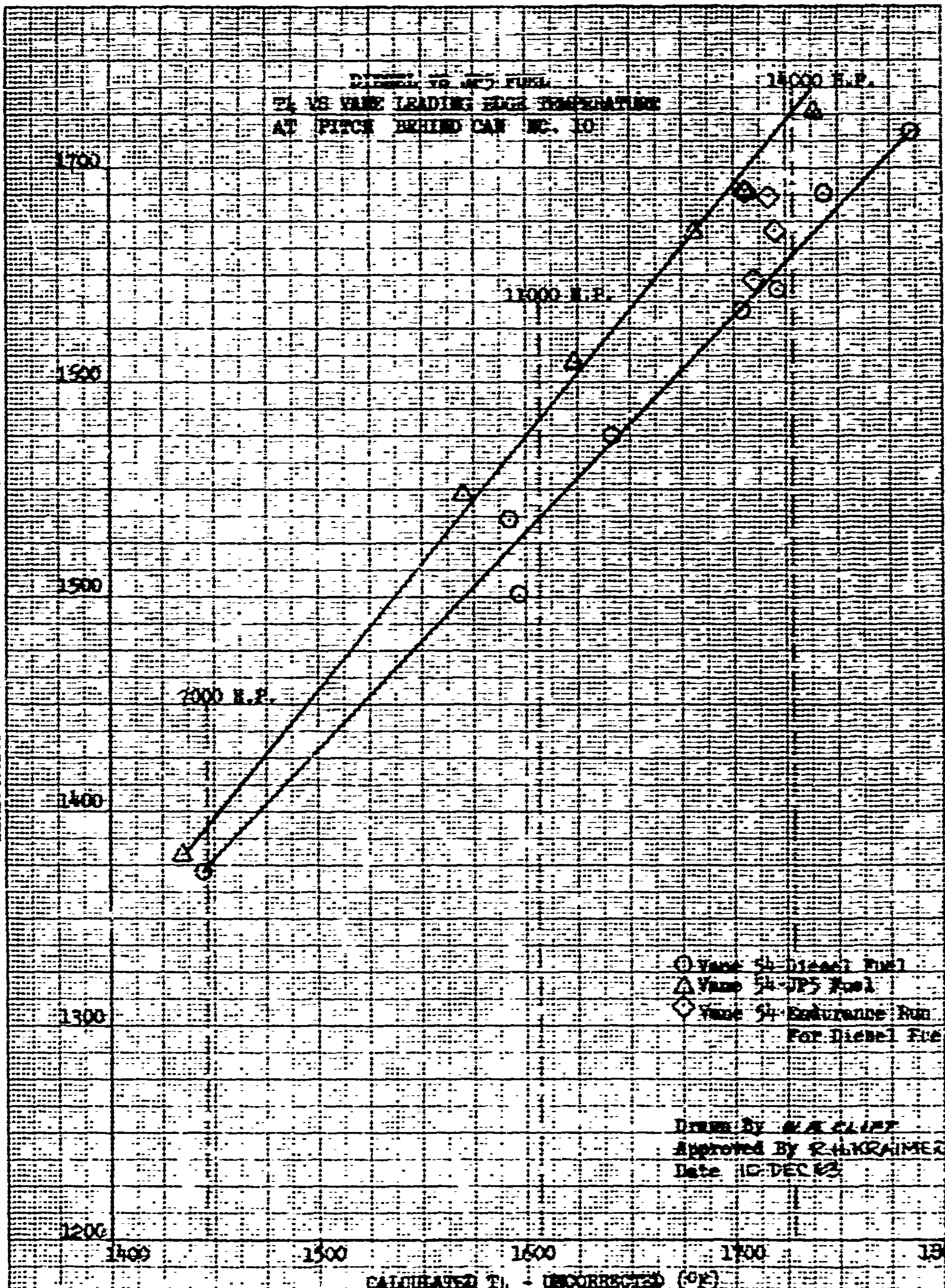


FIGURE NO. 3.5-8

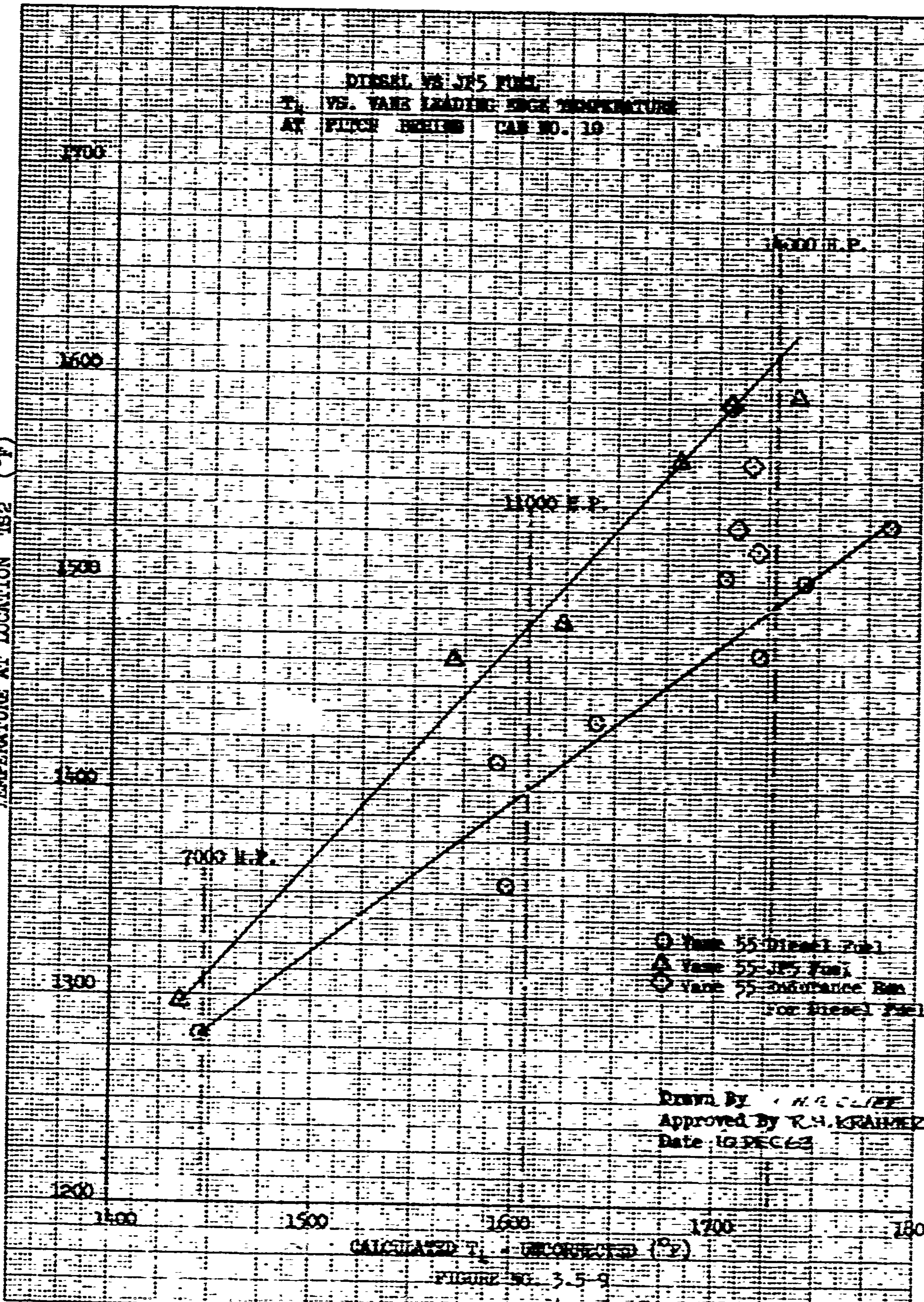


FIGURE NO. 3.5-9

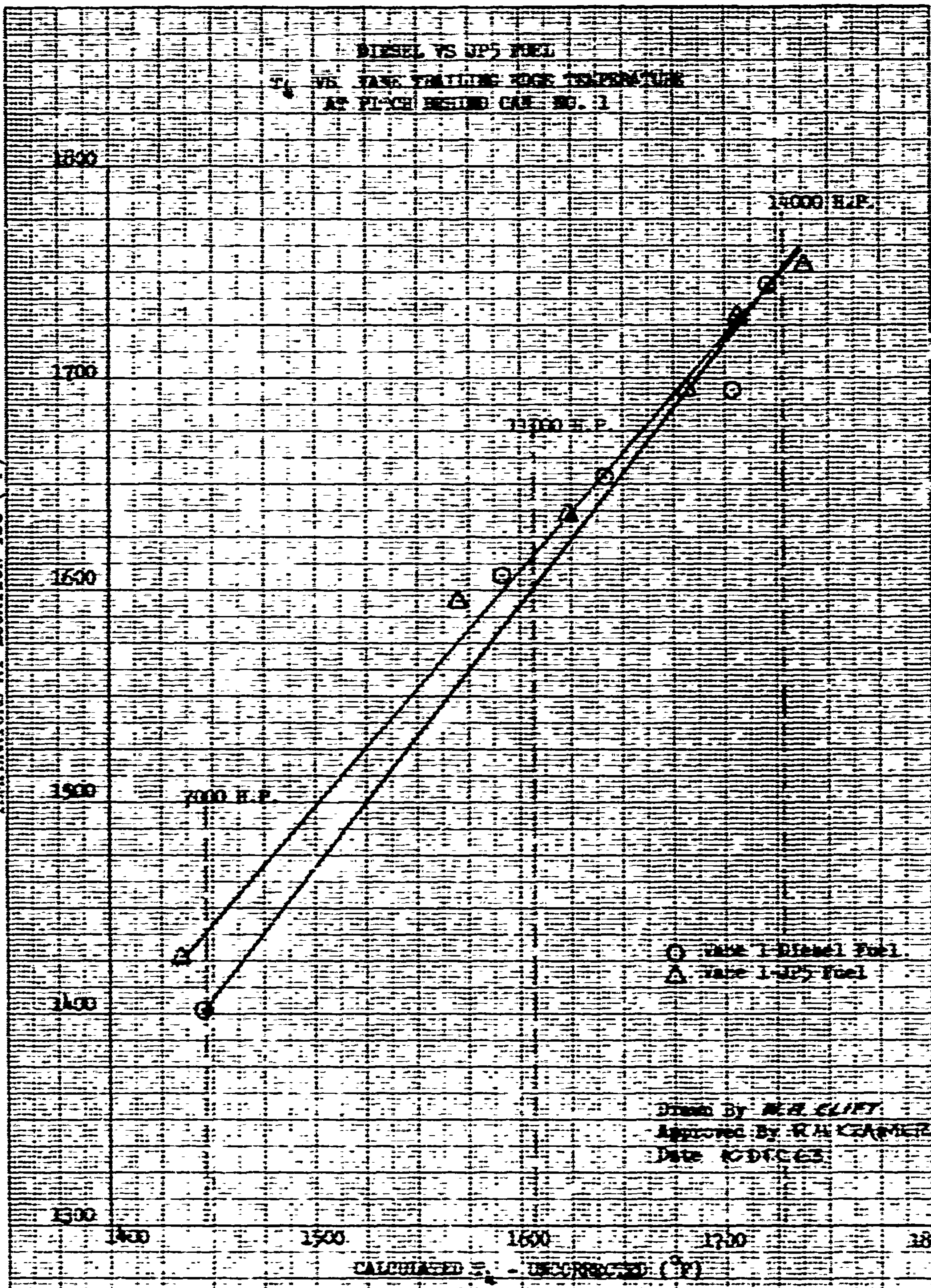


FIGURE NO. 3.5-10

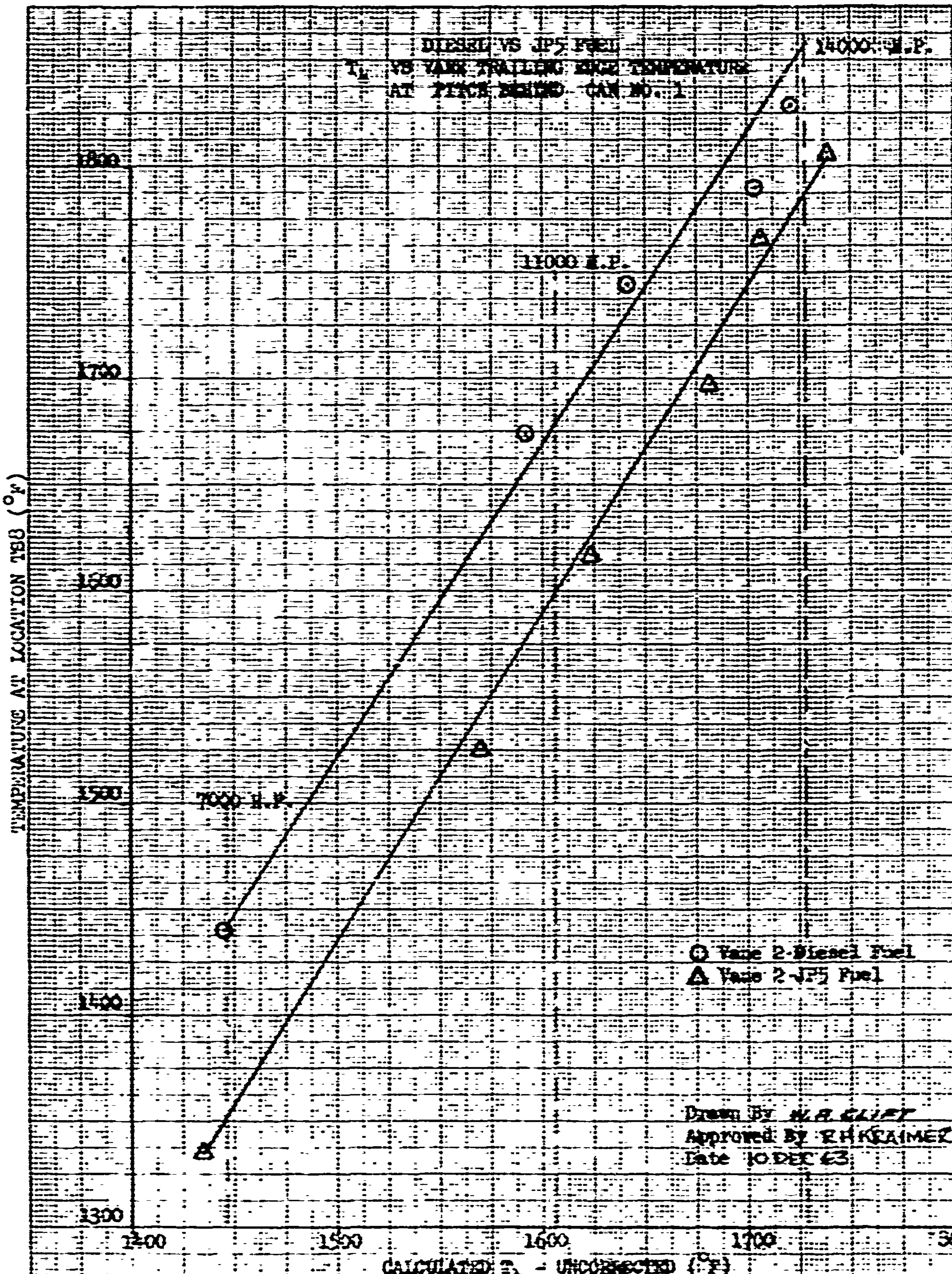


FIGURE NO. 3.5-12

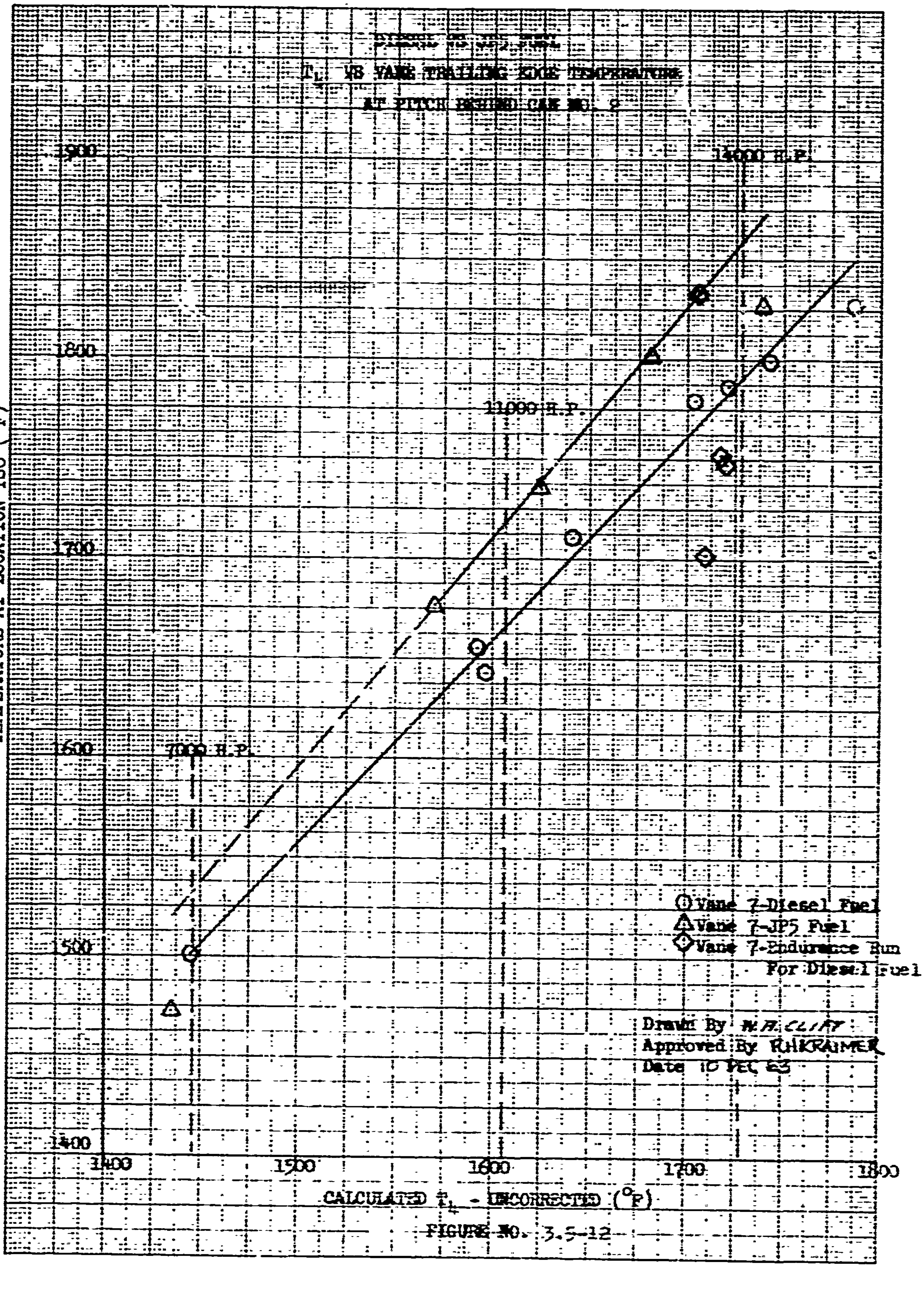


FIGURE NO. 3.5-12

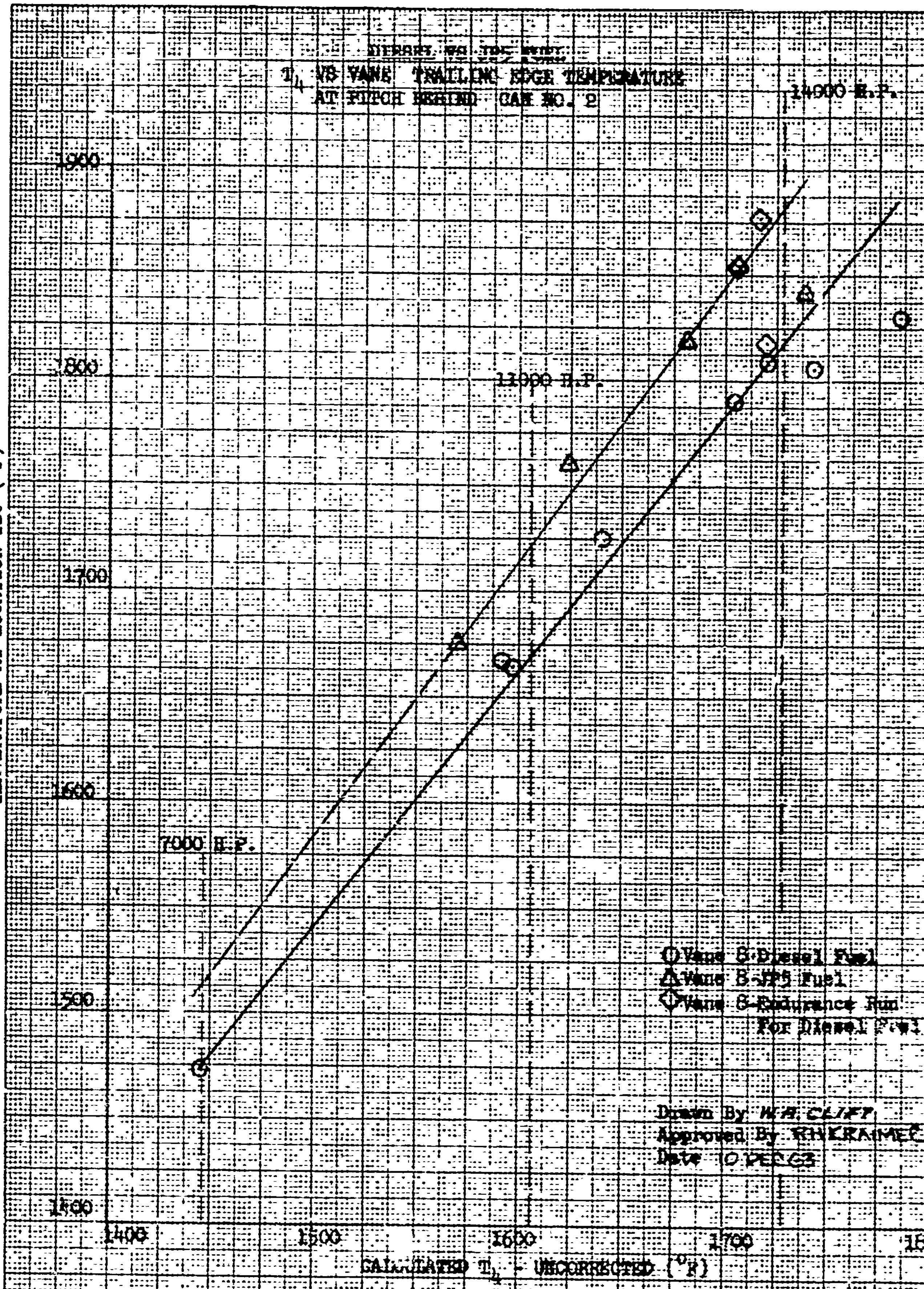


FIGURE NO. 3.5-13

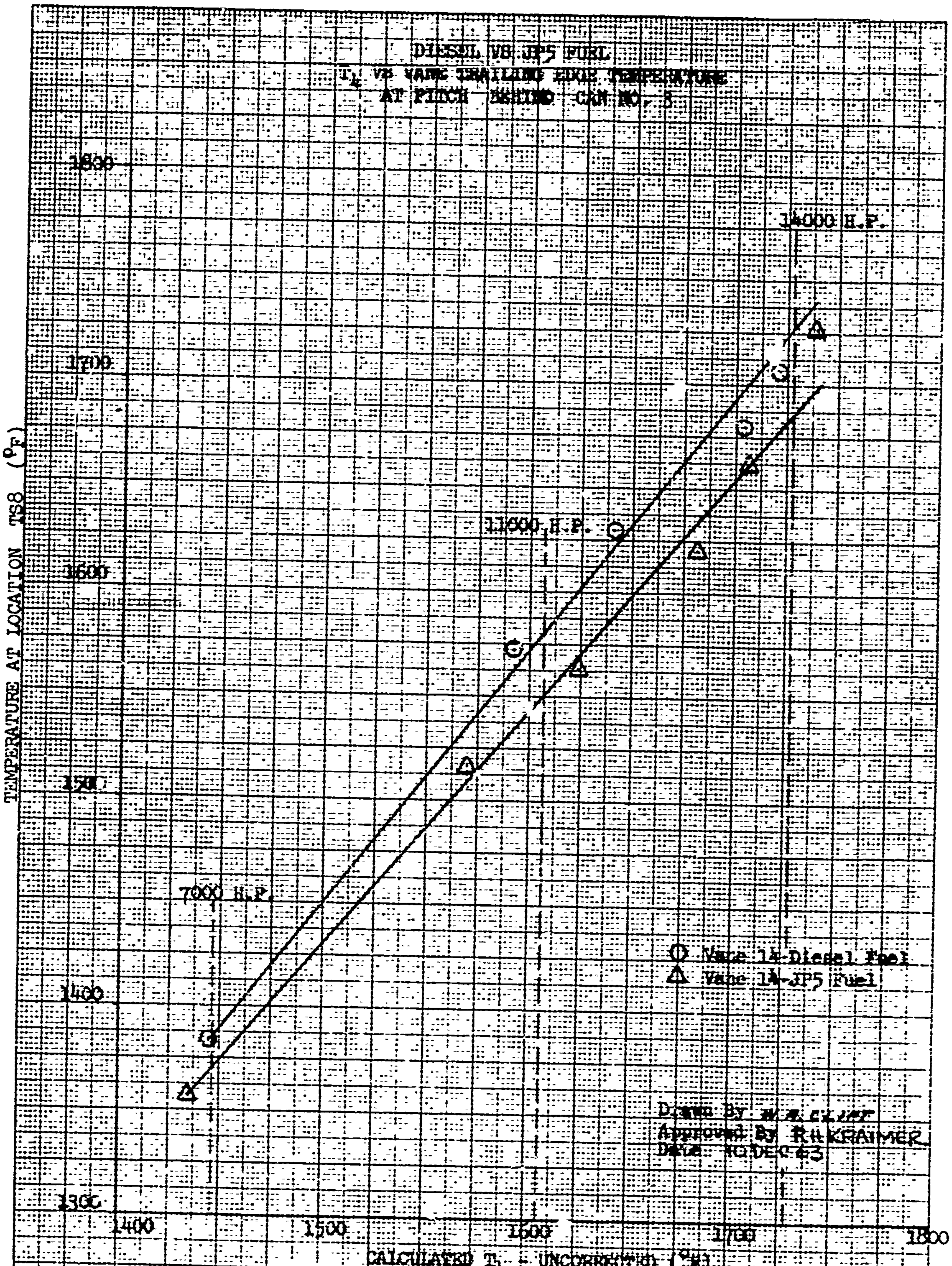


FIGURE NO. 3.5-14

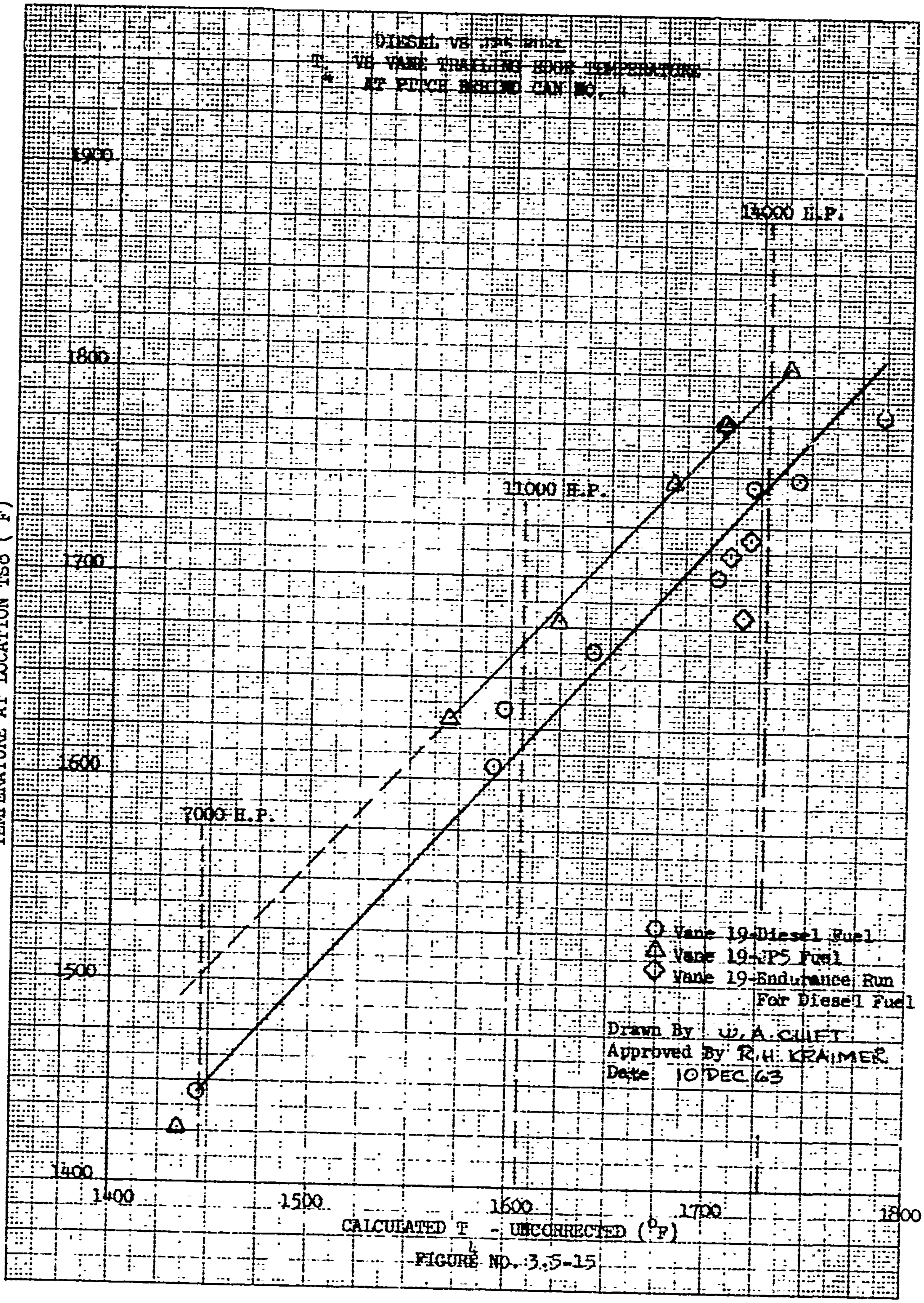


FIGURE NO. 3.5-15

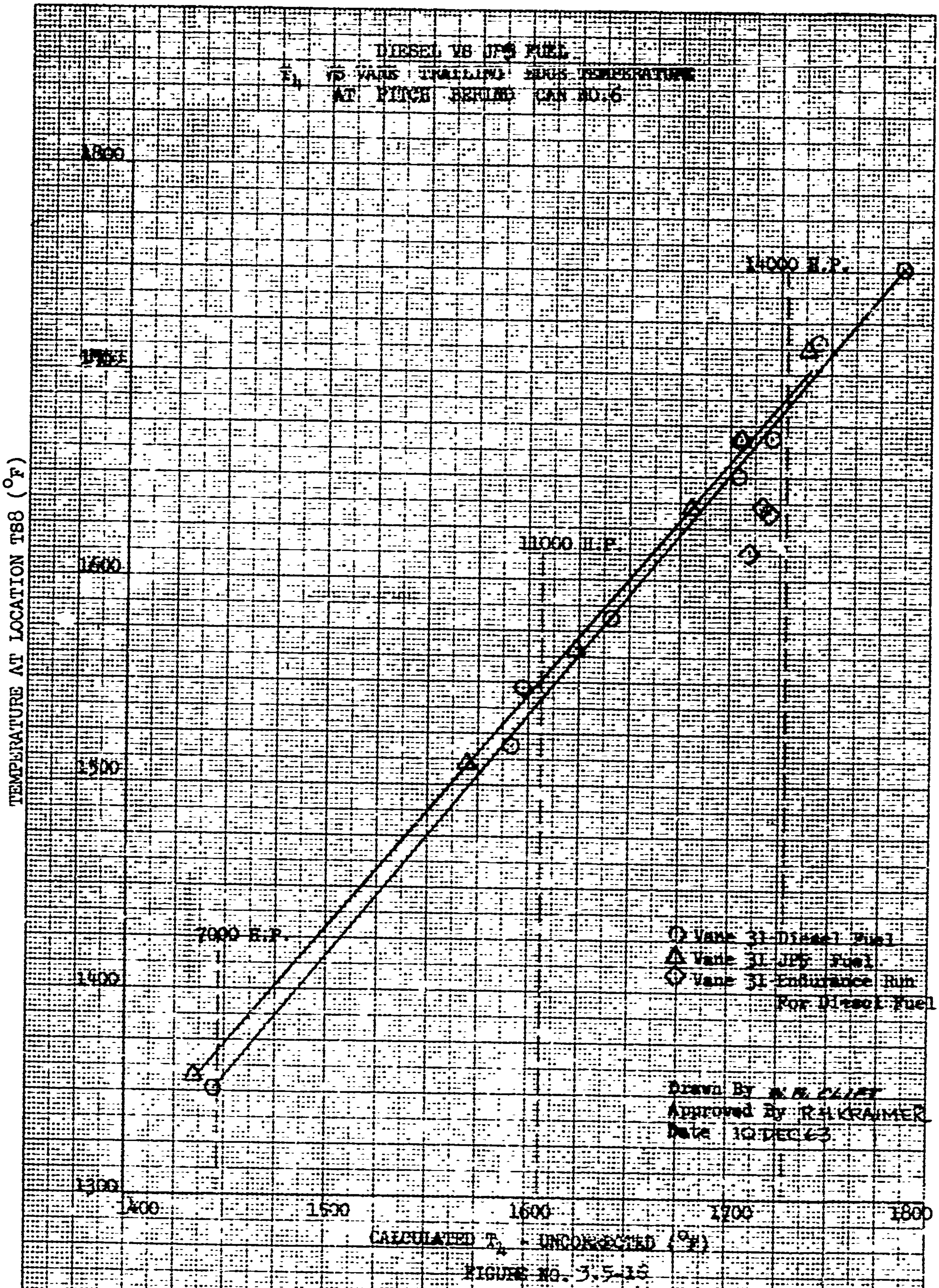


FIGURE NO. 3.5-15

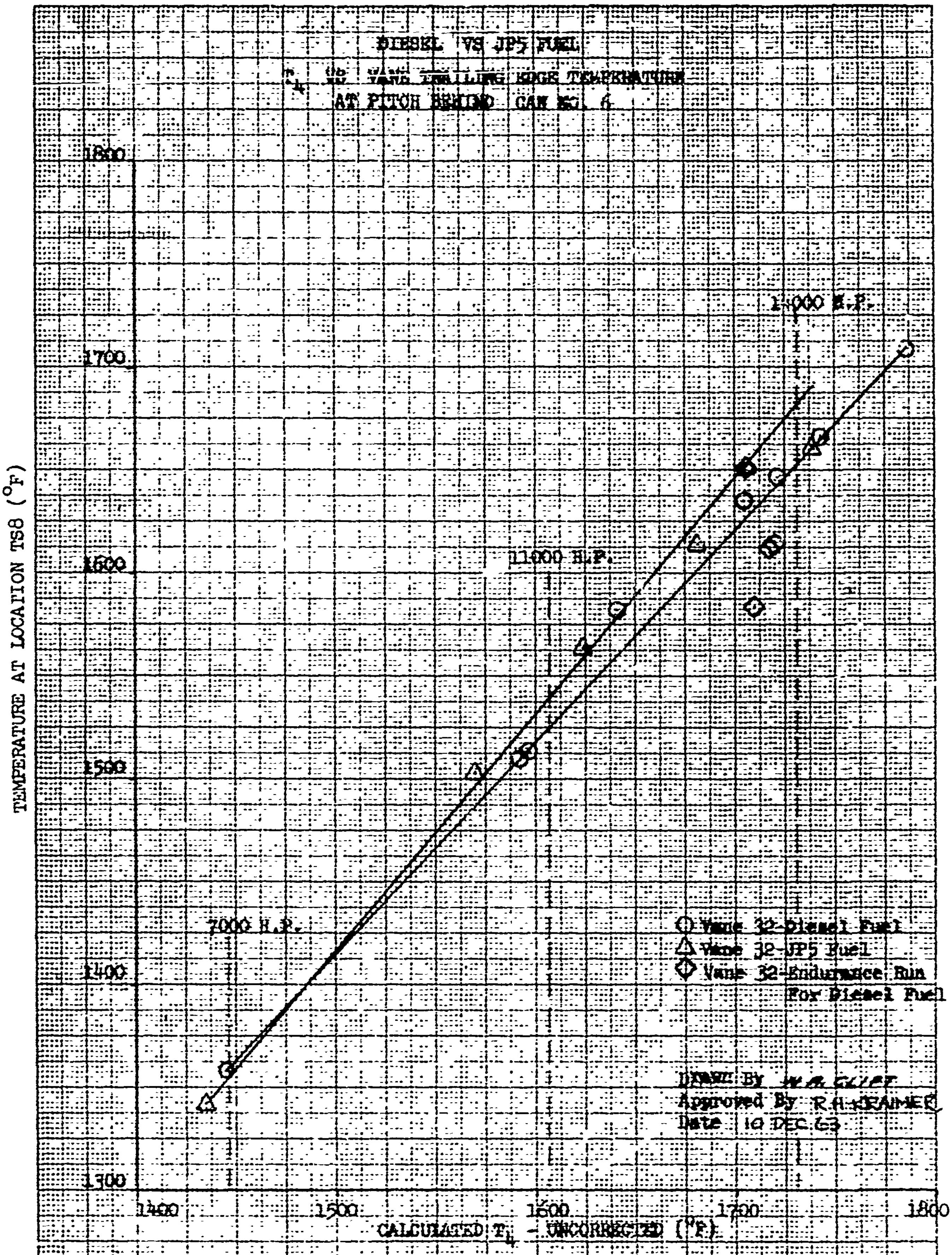


FIGURE NO. 3.5-17

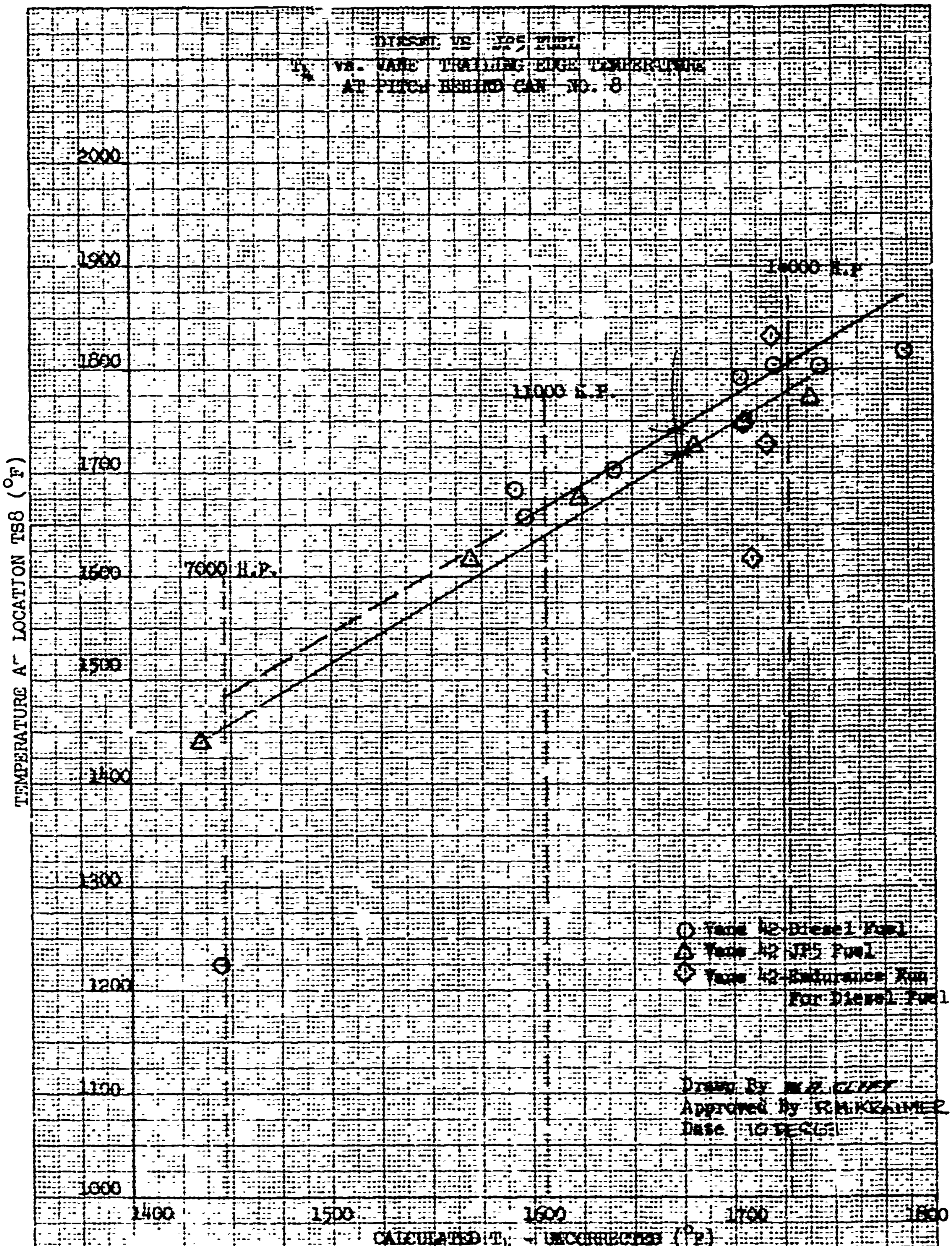


FIGURE NO. 3.5-18

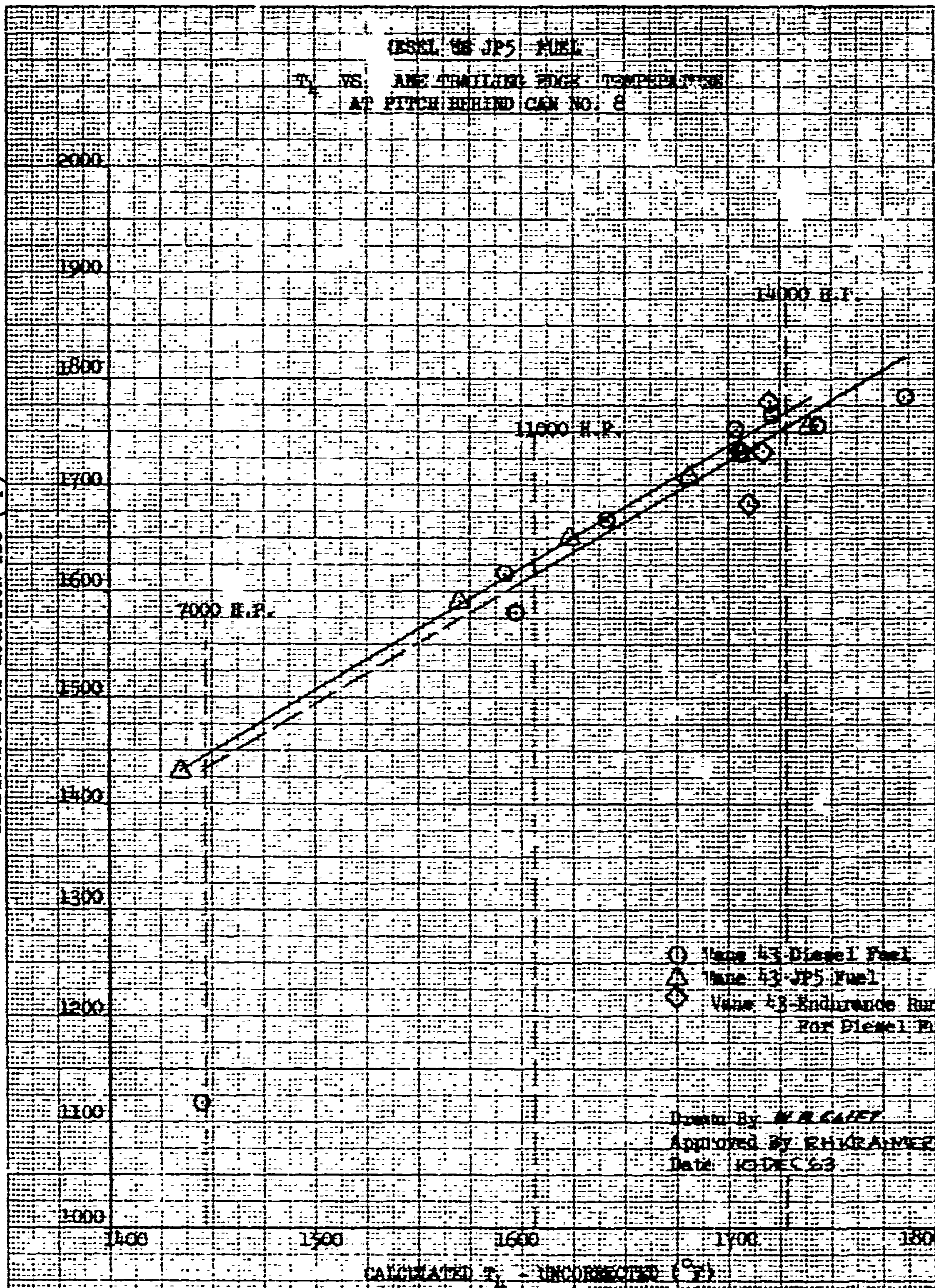


FIGURE NO. 3.5-19

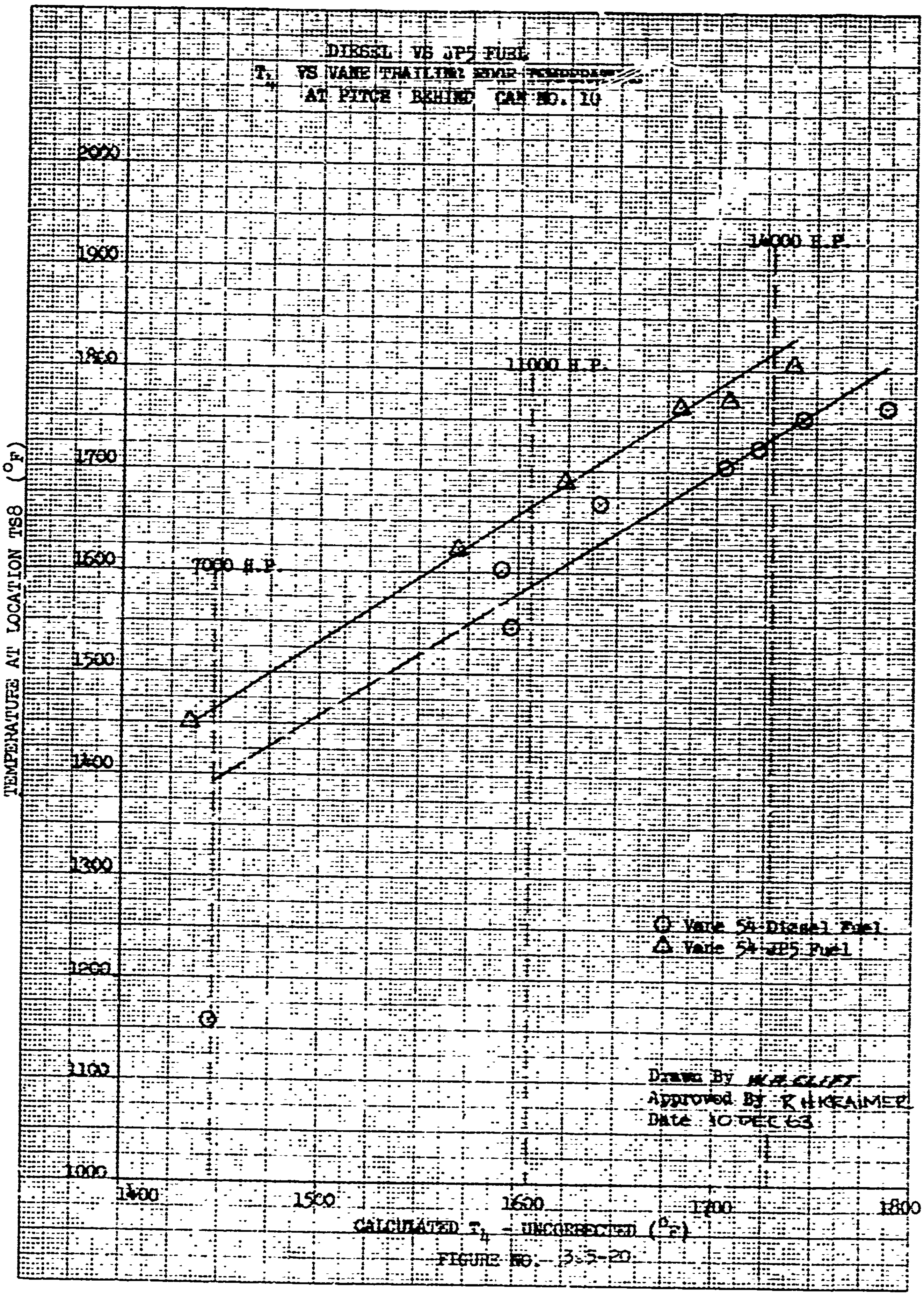


FIGURE NO. 3.5-20

As can be seen in the table on the previous page, inner band temperatures should also be somewhat cooler with diesel fuel than they are with JP-5, refer Figure 3.5-21 thru -37. As can also be seen in the table, however, it is very difficult to put exact figures on anything of this sort. Due to the fact that there were sizeable variations in temperature profile, both radially and circumferentially, refer to Figure 3.5-44 and -45, it was impossible to have enough instrumentation to predict stage 1 turbine nozzle life to the degree that it can be predicted on rotor parts, for instance.

The band temperatures were also noted to become cooler as endurance running progressed but this was attributed mostly to the combustor discharge profile shifting outward away from the inner band.

Generally, the JP-5 results of this test were about as expected. In comparison with JP-5 fuel, the diesel fuel appeared to have a less severe effect on stage 1 turbine nozzle temperatures. Further, the fact that maximum peak T_4 temperatures were often lower with diesel than with JP-5 should be beneficial to vane life. Data points taken during the second and third 10 hour endurance runs on diesel fuel usually straddled the curve for the diesel temperature survey, indicating no significant change one way or the other. Refer to Figures 3.5-46 and -47.

3.6 Start Tests

Using a mixture of Standard Of Ohio MIL-F-16884D diesel fuel and napthanic base lube oil per MIL-L-15016, grade 2110 to produce a viscosity of 6.0 centistokes at 100°F, a successful engine light off was obtained at all test fuel temperature levels. Refer to Figure 3.6-1 thru -7. P6 fuel nozzle installed in ignition can for all testing. This testing verified the known fact that starting fuel flow has a significant effect on the capability of the engine to reach idle speed. As shown in Figure 3.6 -8, the engine would not accelerate to idle with a fuel viscosity of 19.5 centistokes at a starting fuel flow of 455 PPH (start #23). However, with a starting fuel flow of 500 PPH, the engine accelerated to idle at a viscosity of 20.2 centistokes (start #39). An engine accleration to idle was obtained at 26°F (Figure 3.6-7) which was the minimum fuel temperature at which an acceleration was attempted. Fuel flow was 540 PPH. Refer Figure 3.6-8 (start #40). Total start time was 136 sec. from initiation of start fuel flow and ignition to idle speed. The viscosity of the fuel at 26°F was determined to be 28.7 centistokes for an average of four samples. The outside air temperature ranged from 54°F to 63°F during the start test. The slight difference between the air and fuel temperature was not considered to have had a significant effect on the test results.

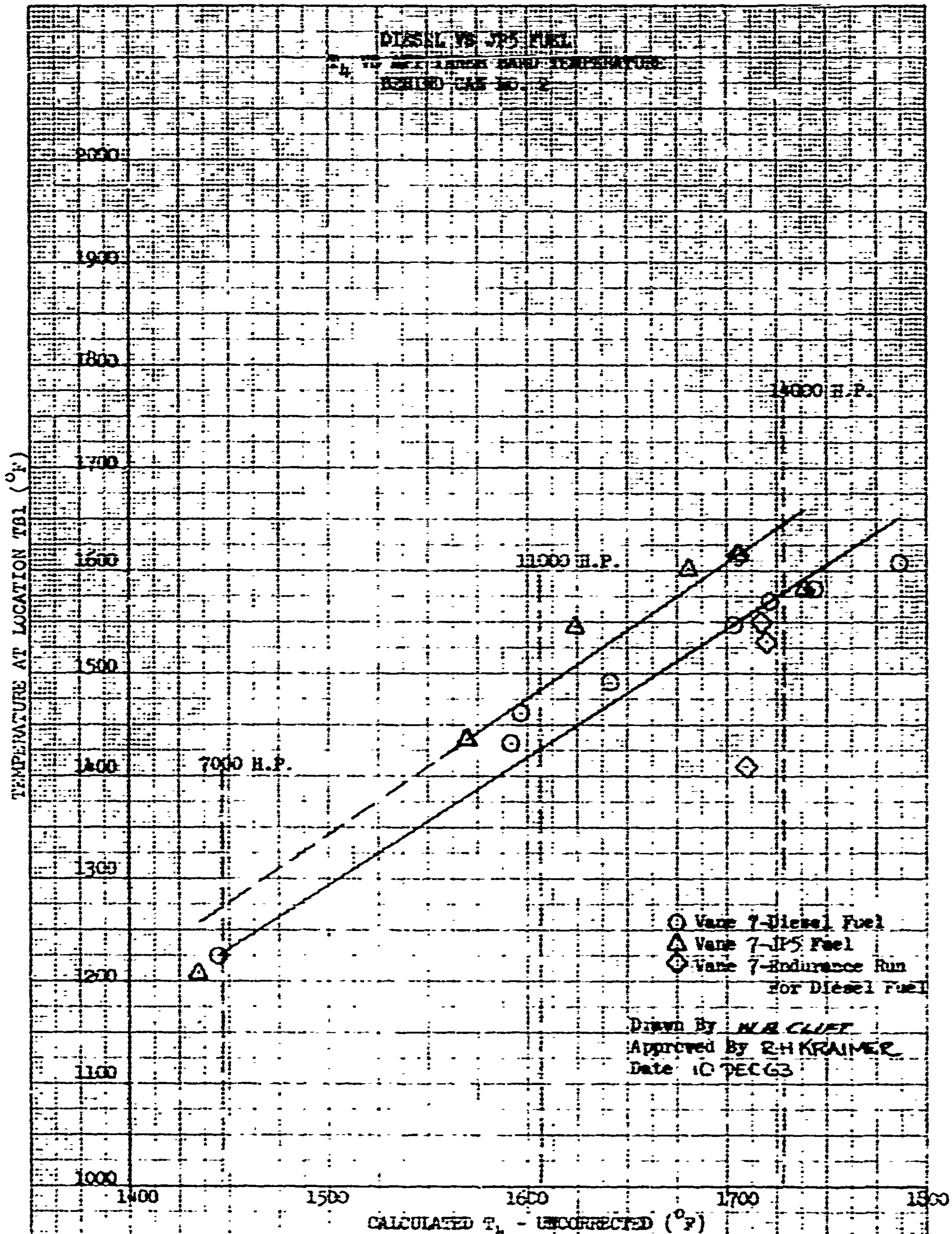


FIGURE NO. 3.5-21

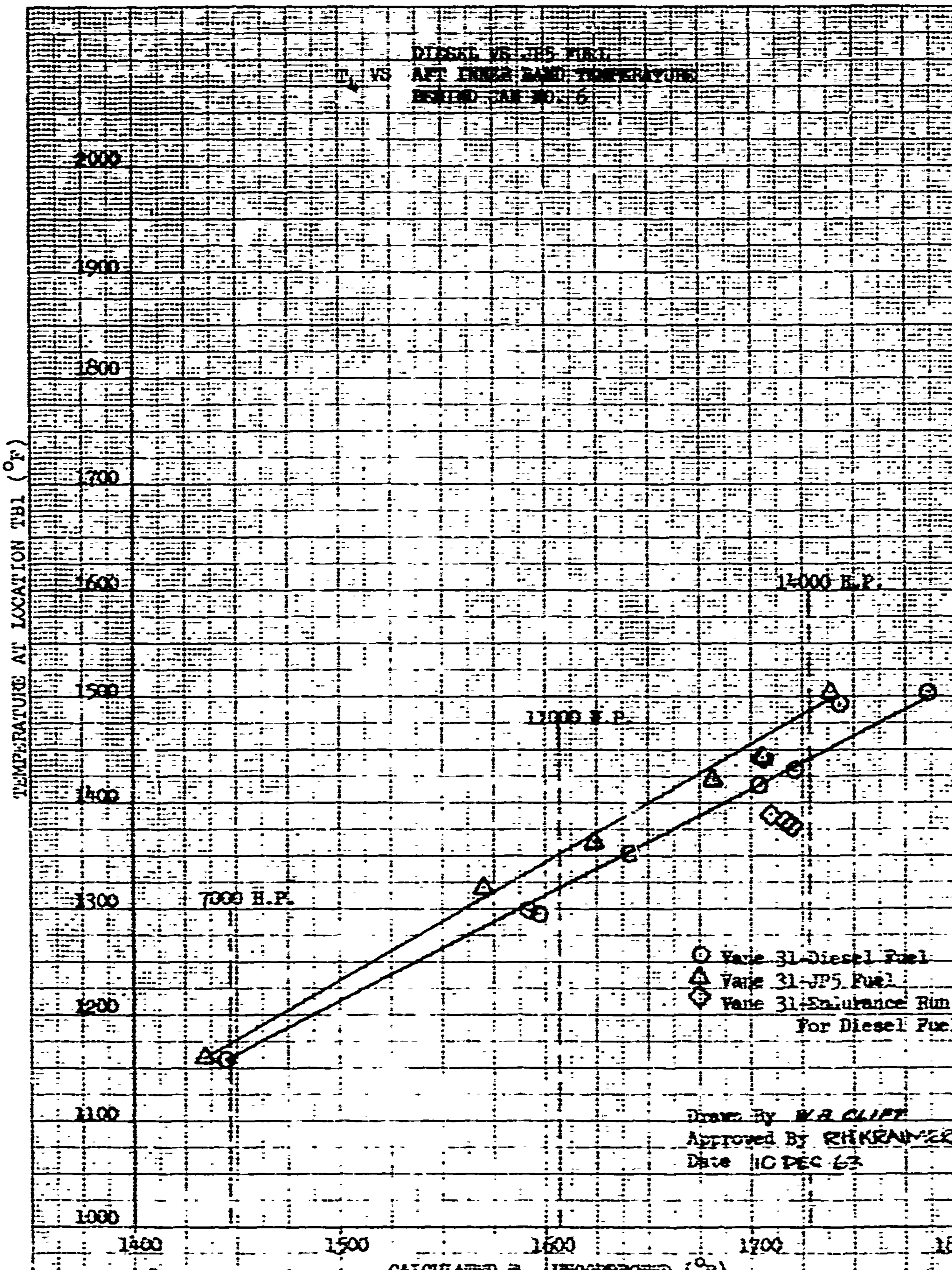


FIGURE NO. 325-22

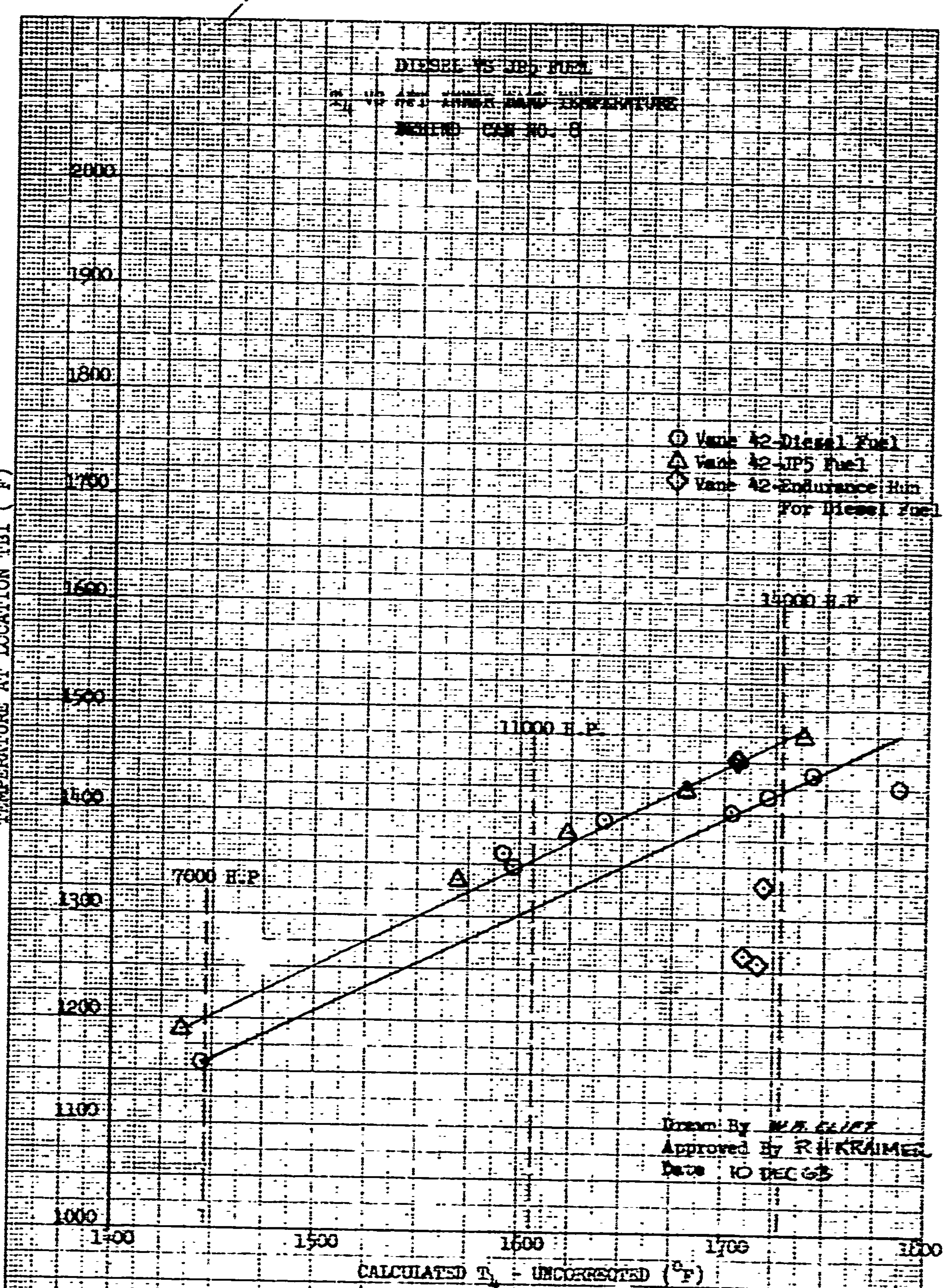


FIGURE NO. 3.5-23

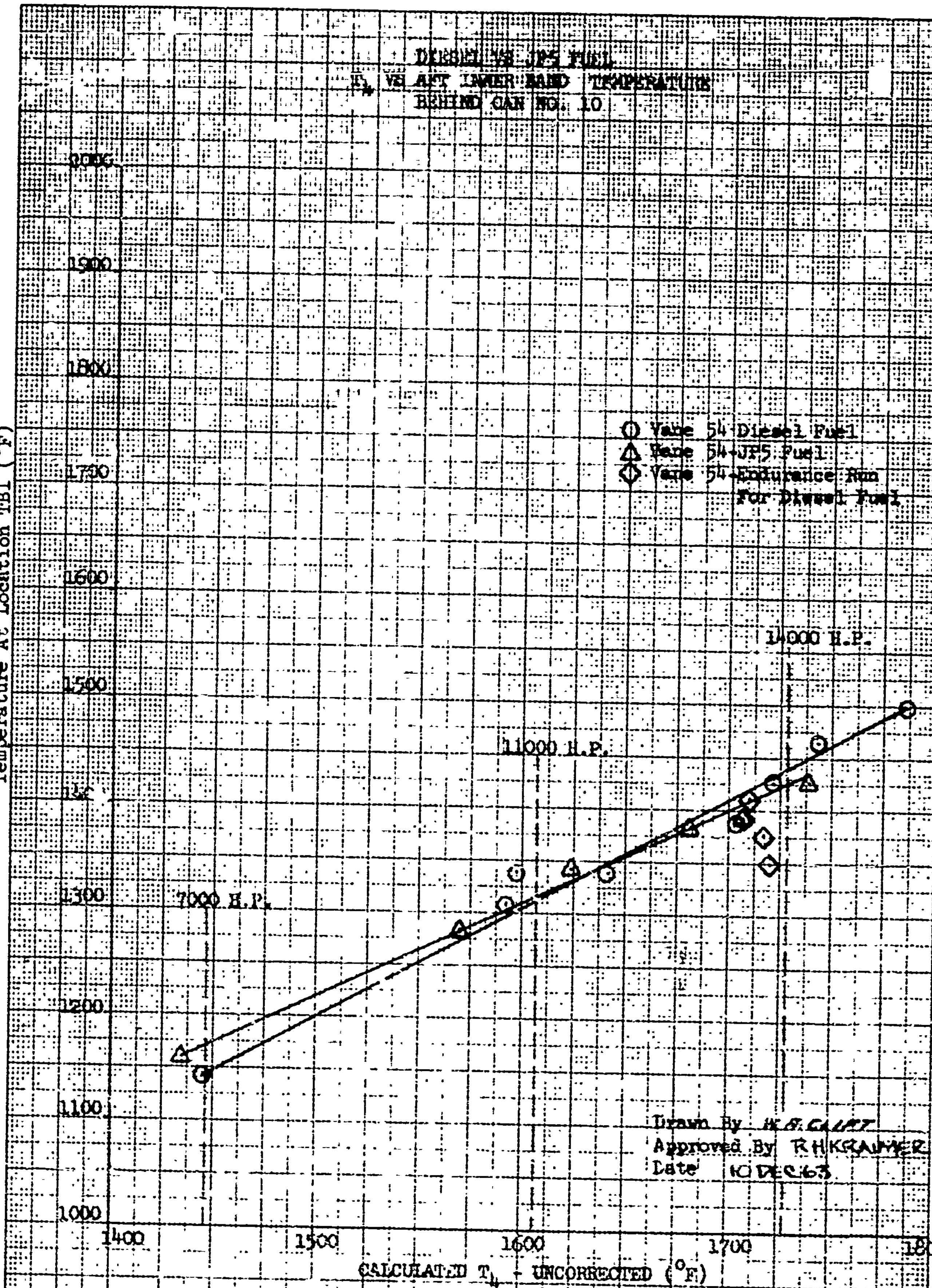


FIGURE NO. 3.5-24

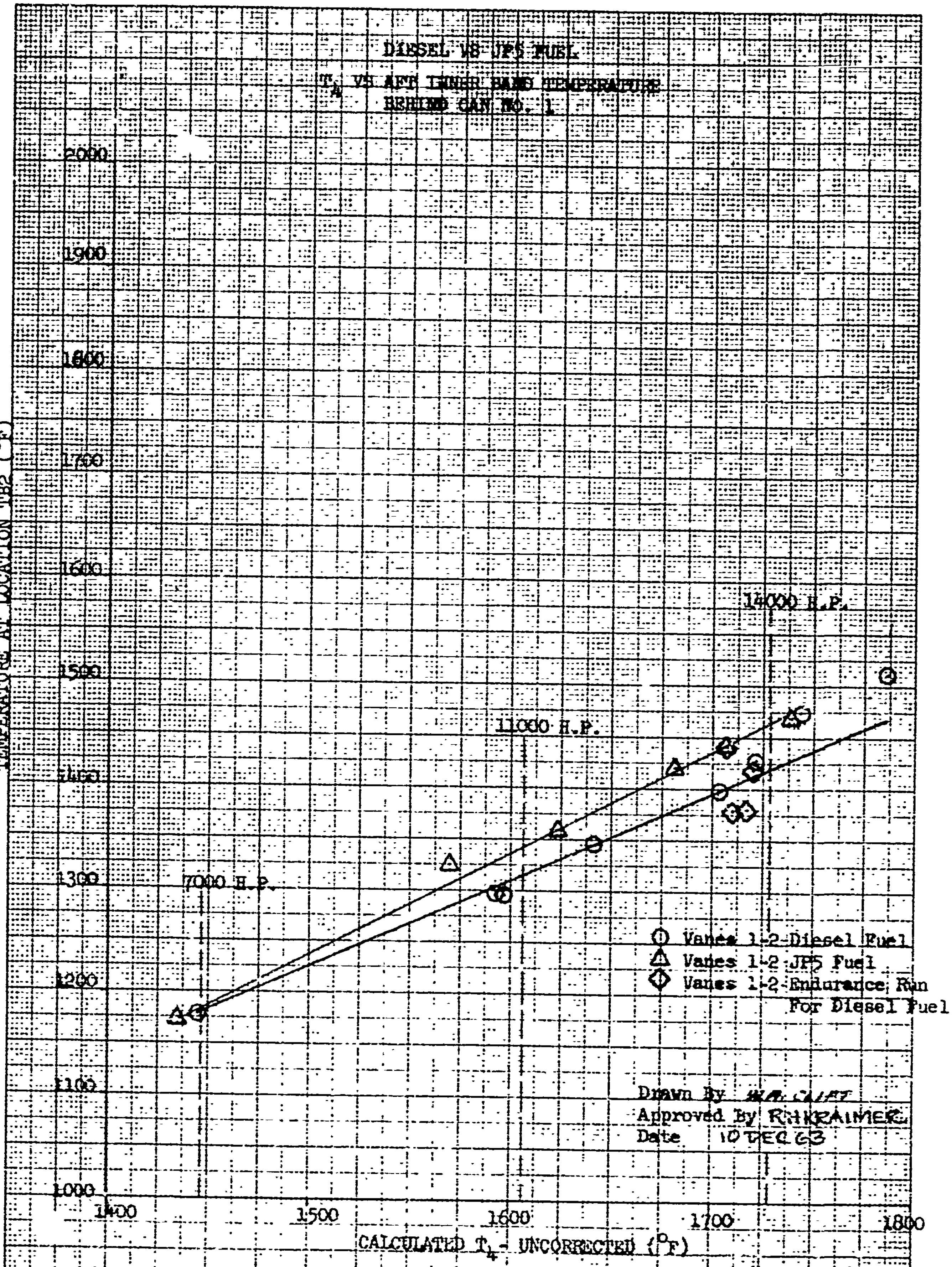


FIGURE NO. 3.5-25

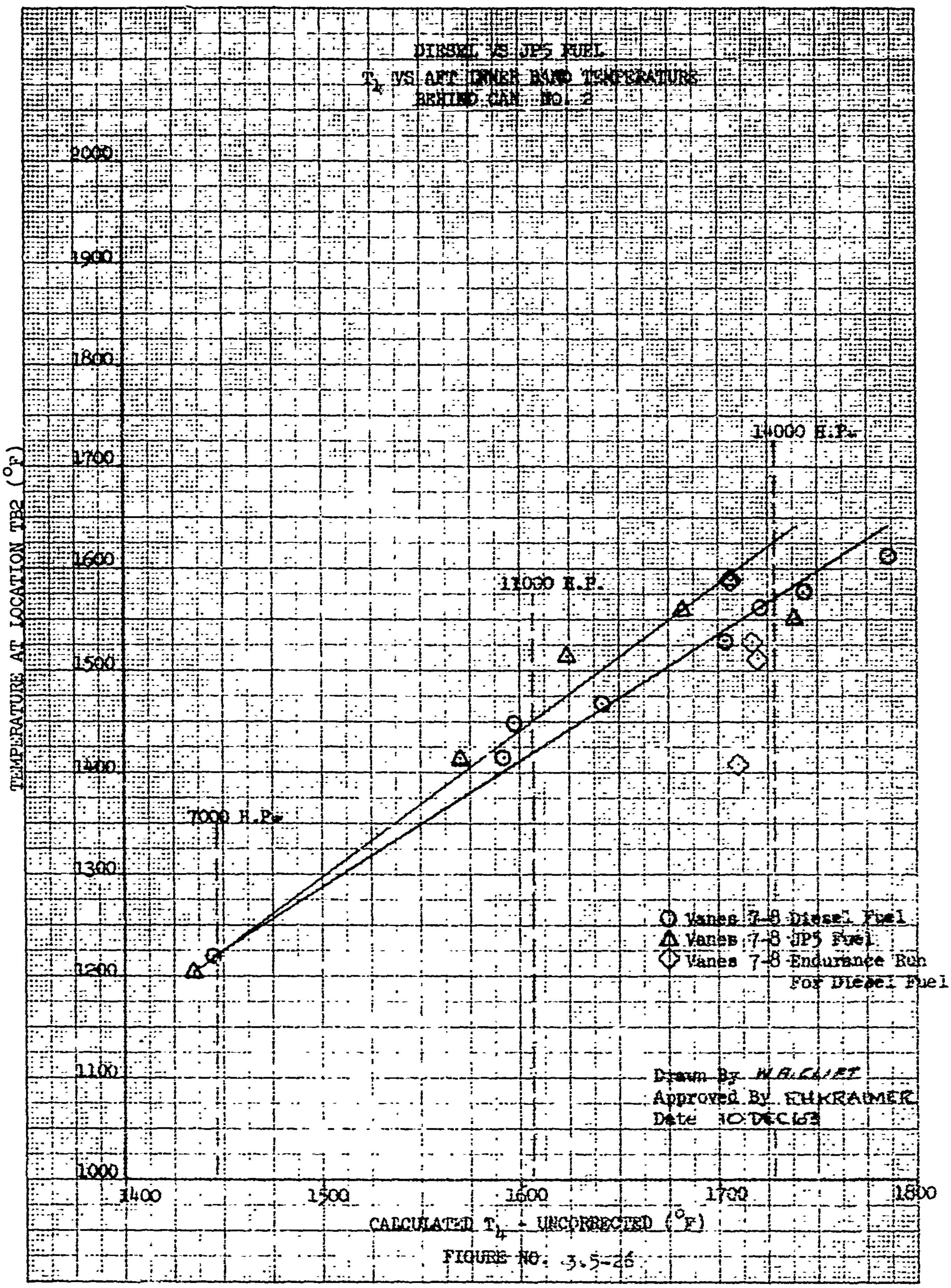


FIGURE NO. 3.5-26

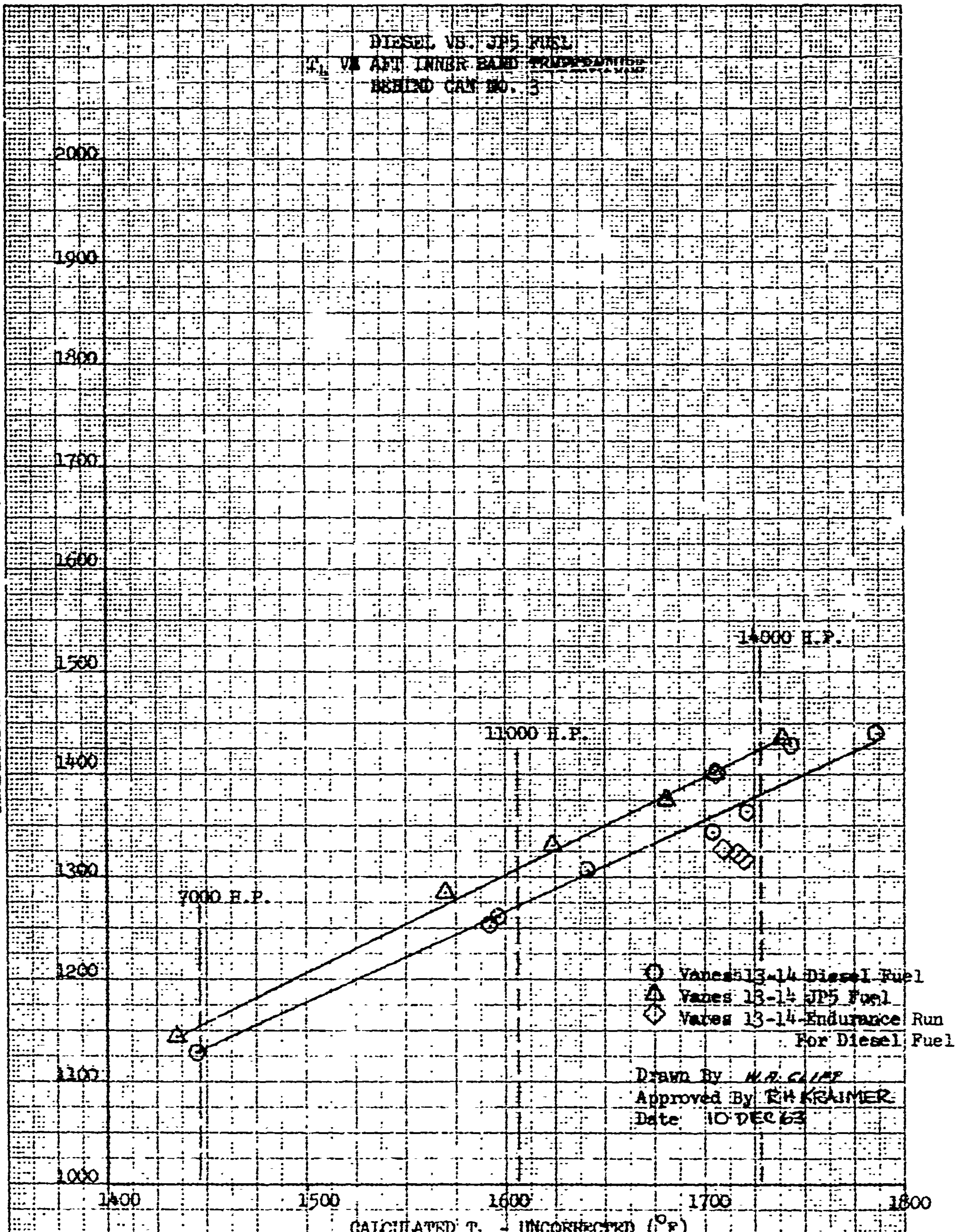


FIGURE NO. 3.5-27

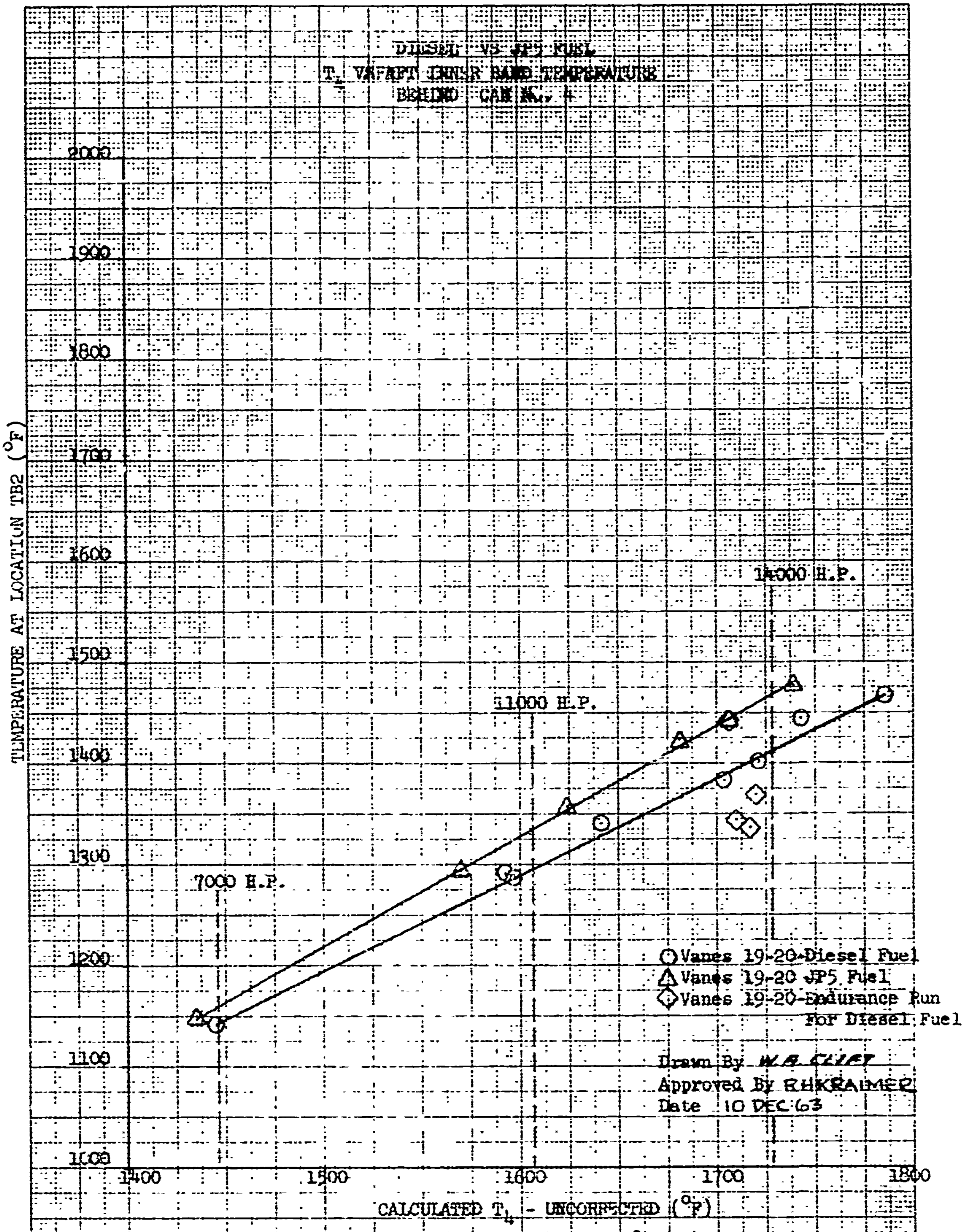


FIGURE NO. 3.5-28

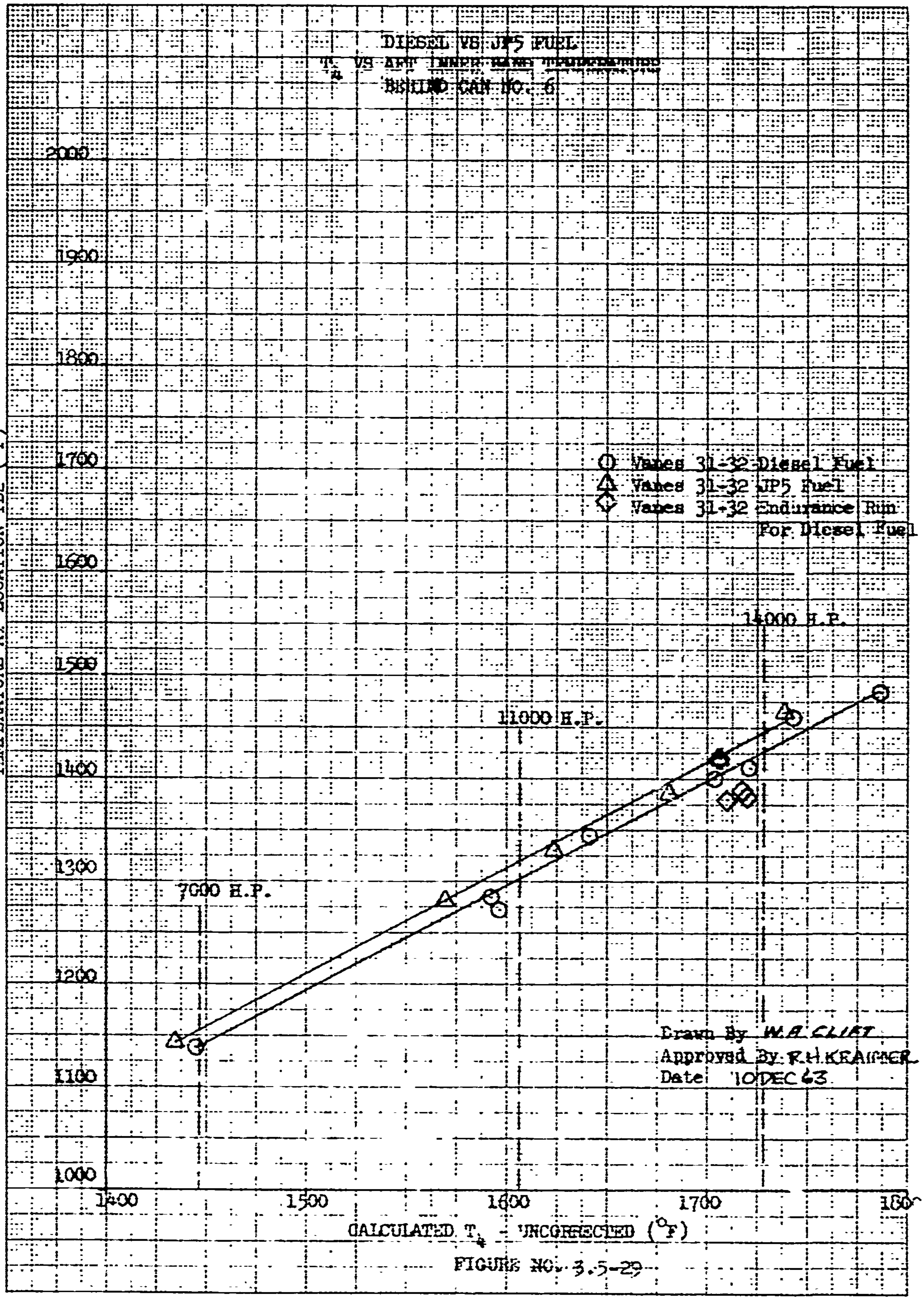


FIGURE NO. 3.5-29

DIESEL VS JP5 FUEL

T_4 VS HPT INNER BAND TEMPERATURE

BEHIND CAN NO. 10

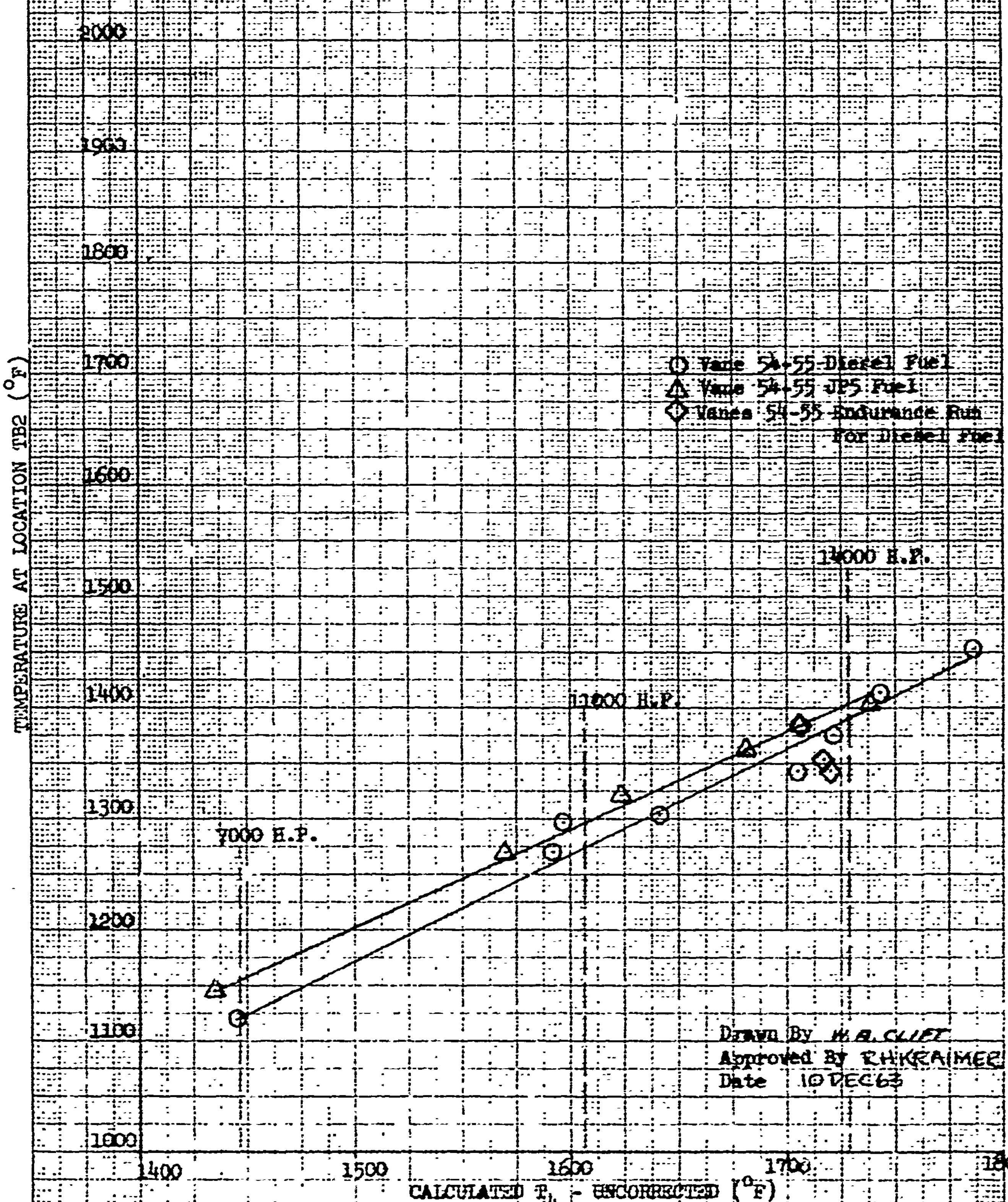


FIGURE NO. 3.5-30

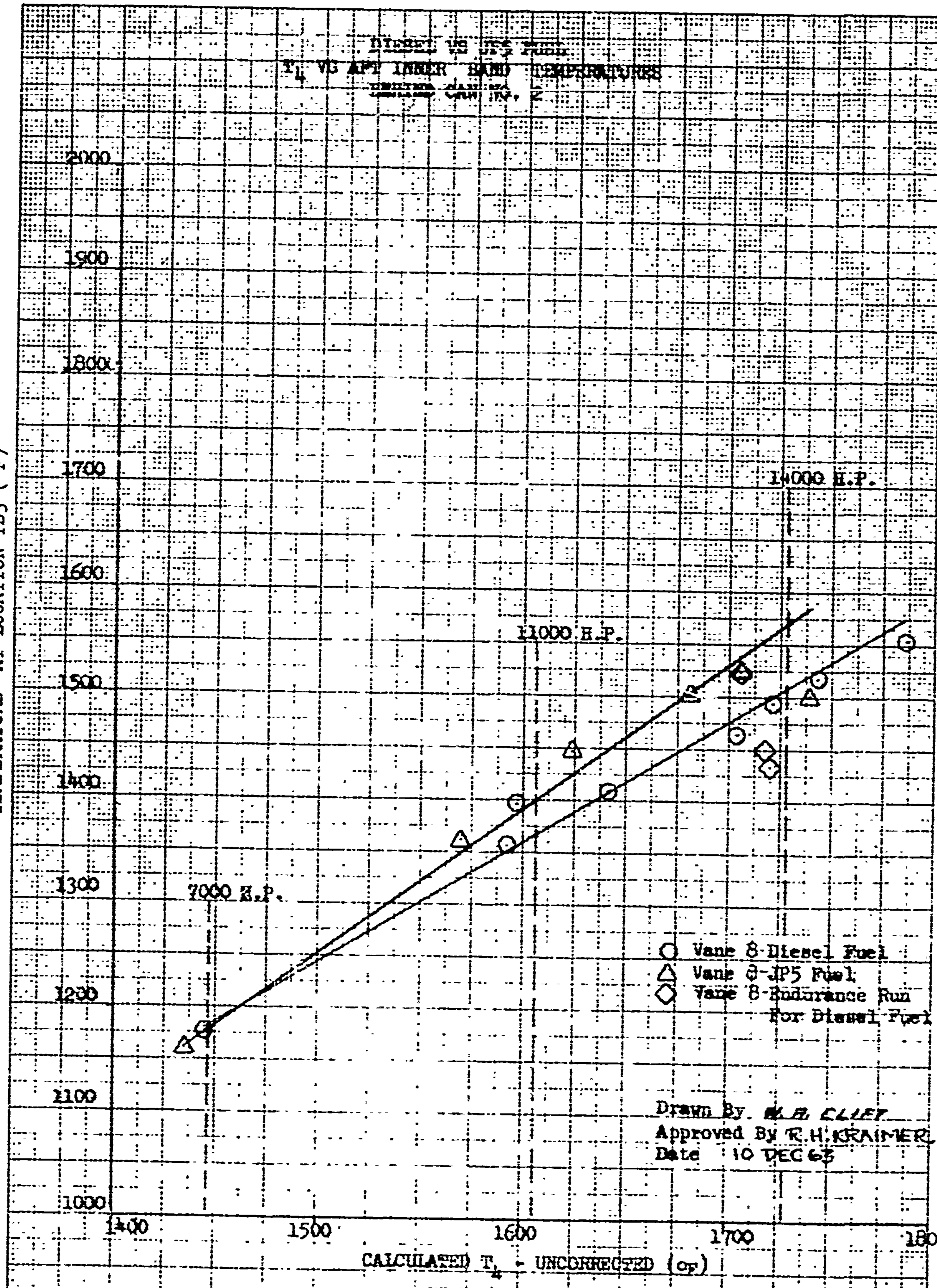


FIGURE NO. 3-5-31

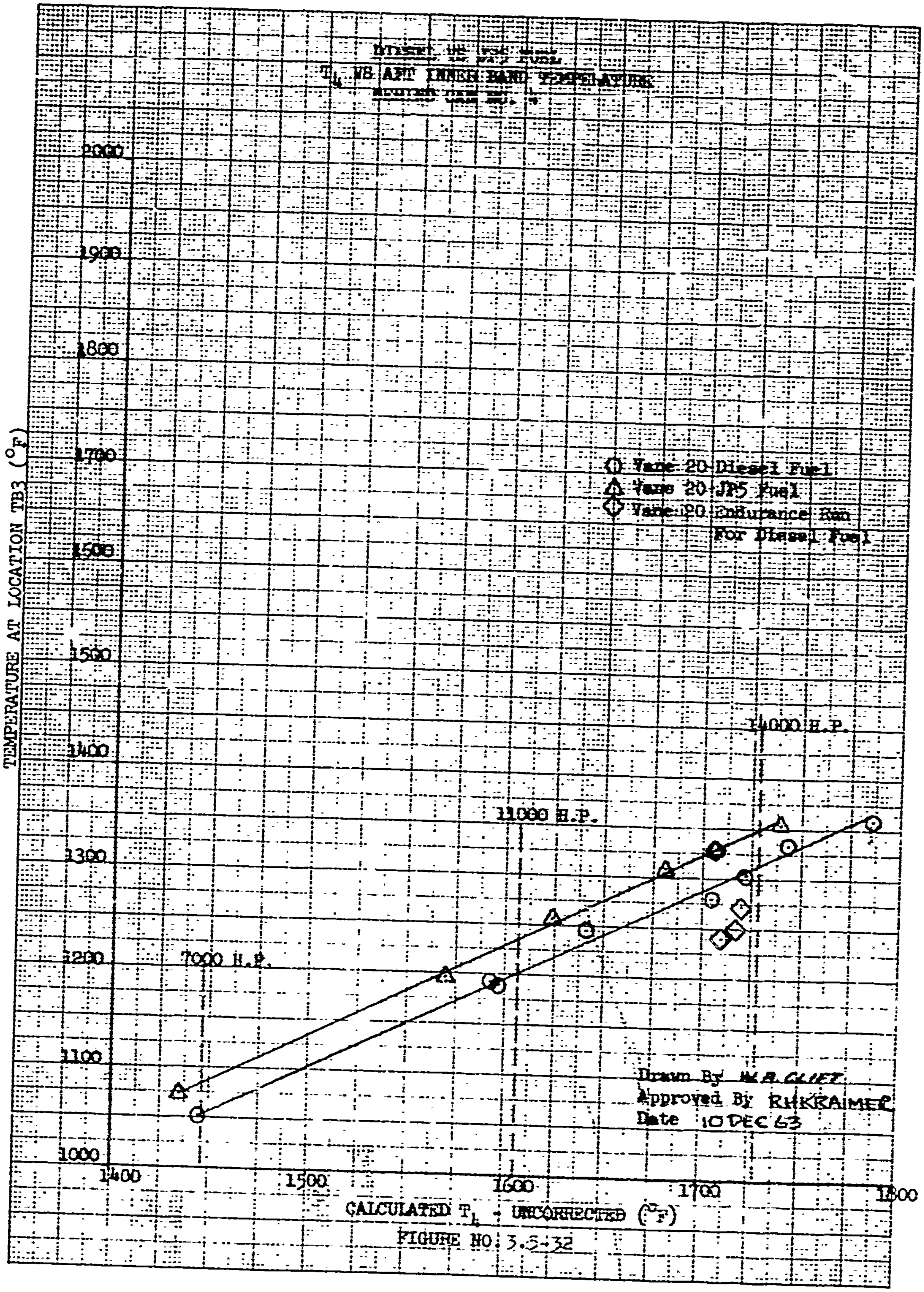


FIGURE NO. 3.5-32

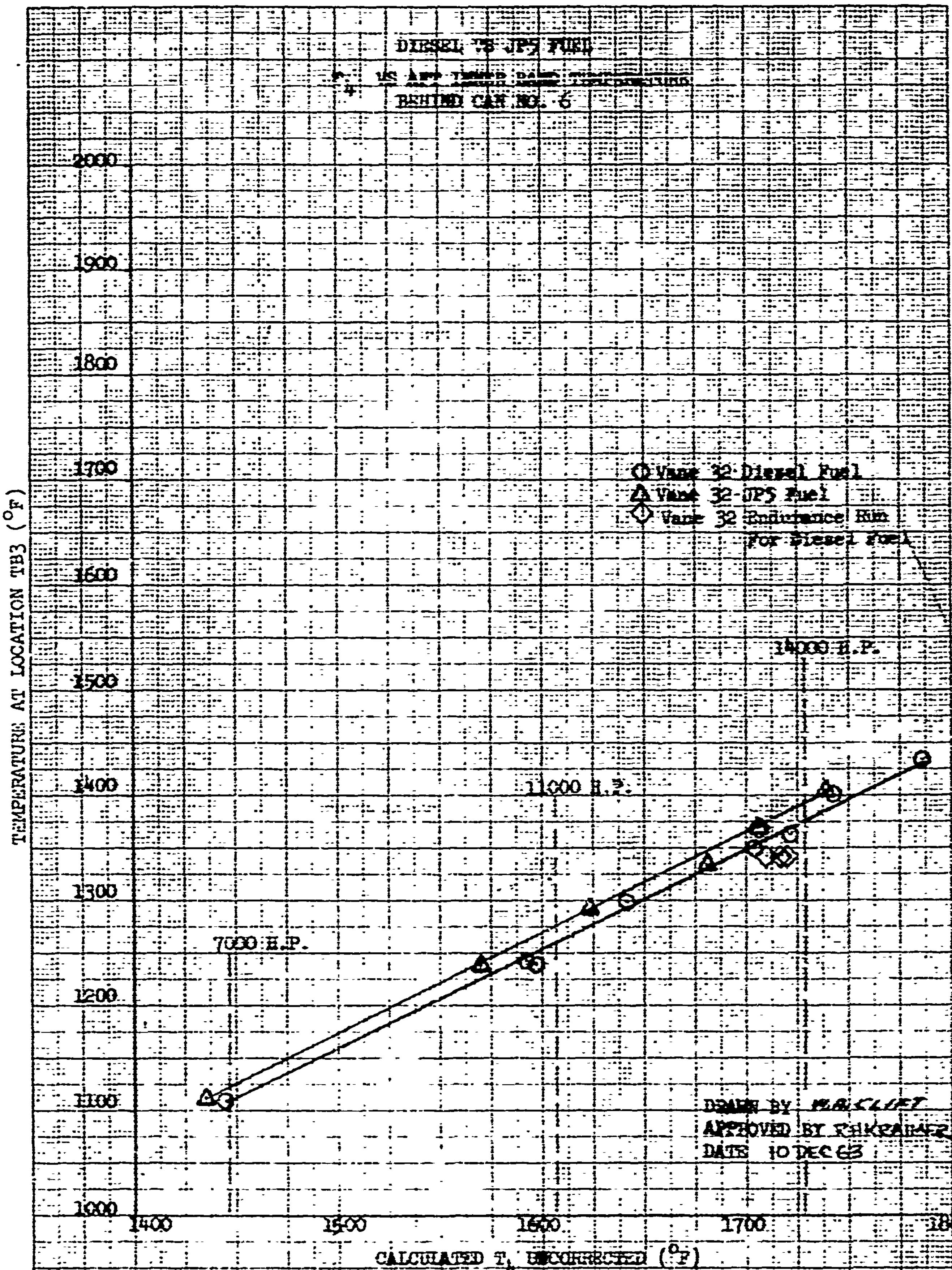


FIGURE NO. 3.5-33

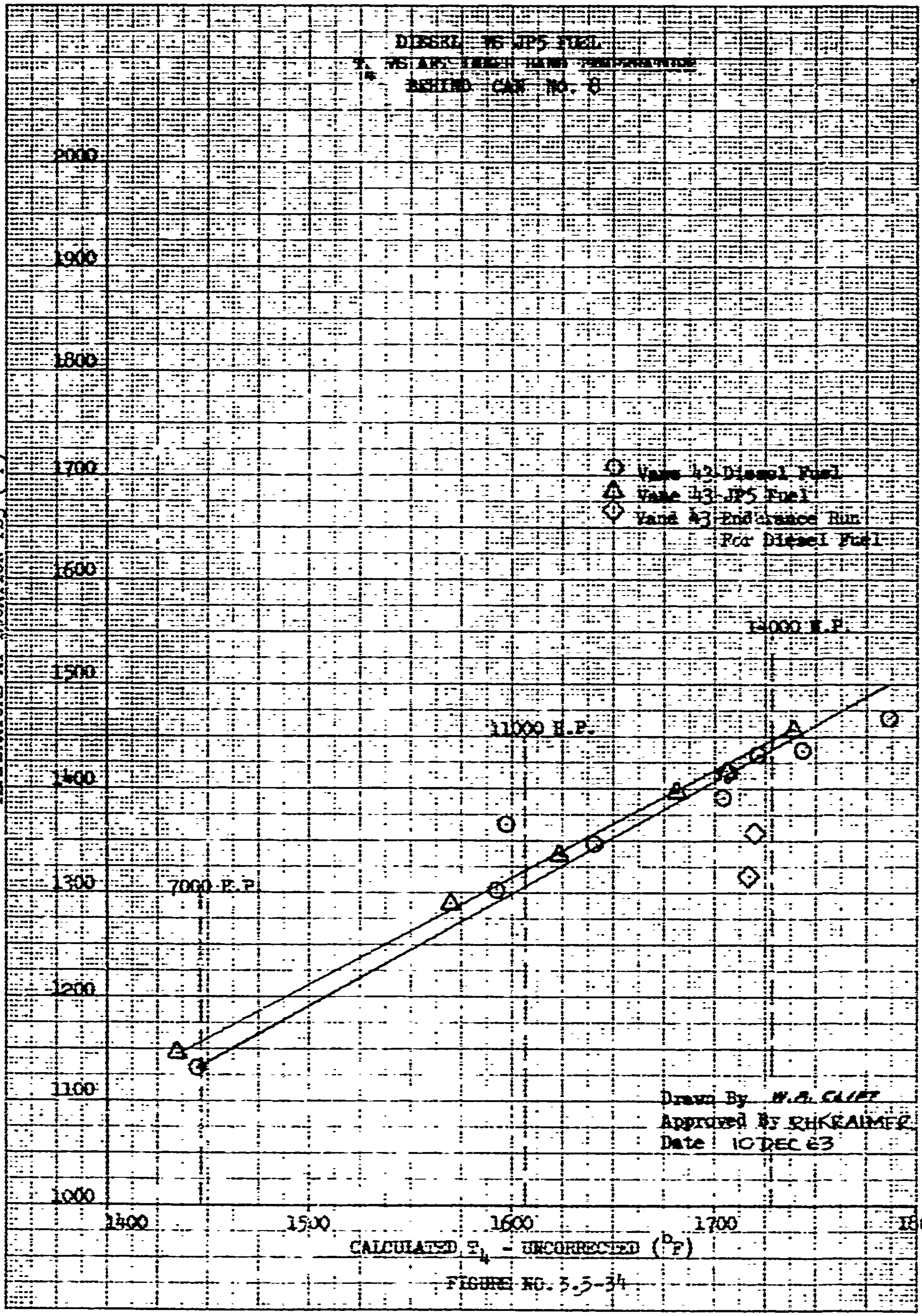


FIGURE NO. 3.5-34

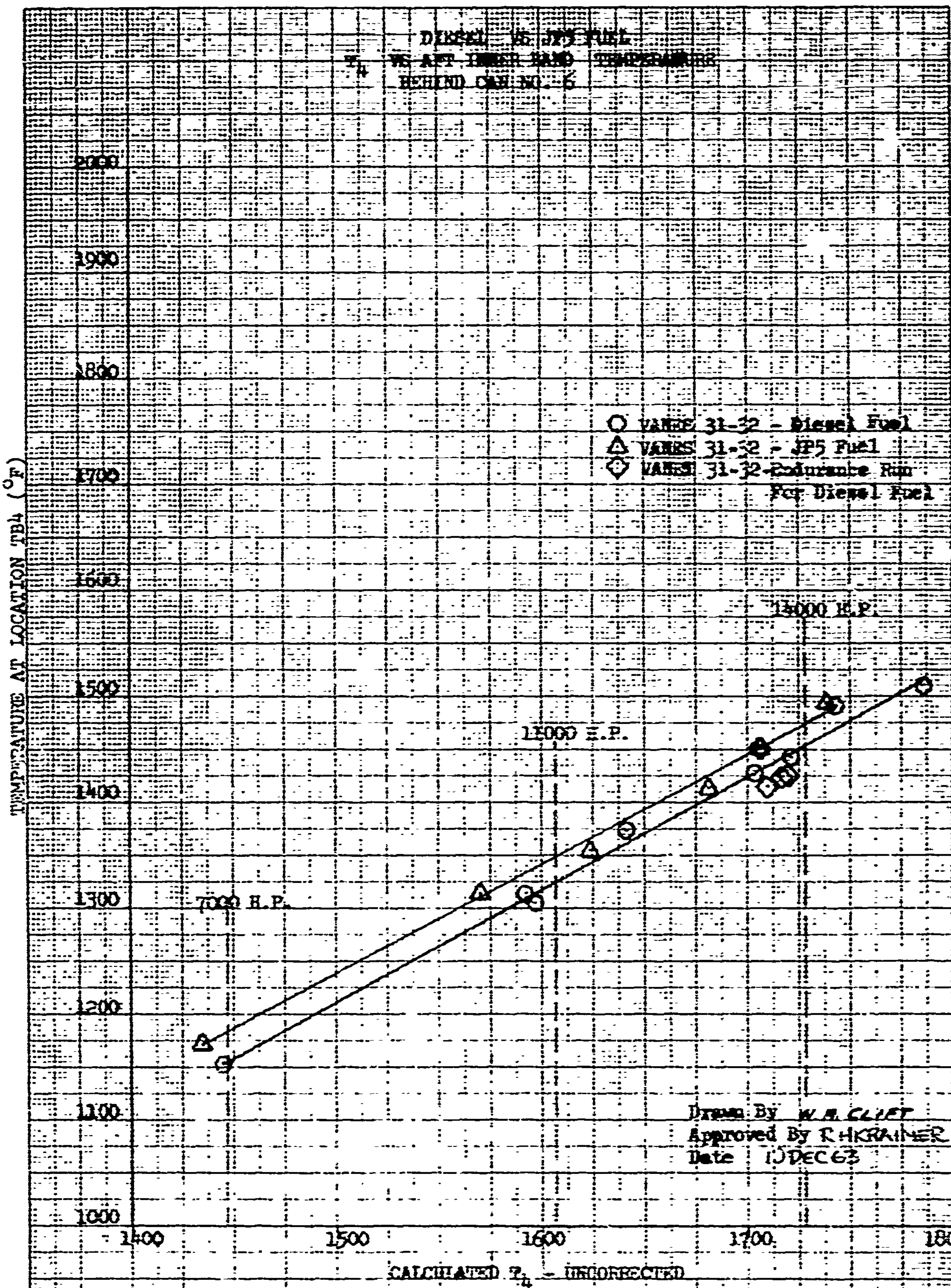


FIGURE NO. 3.5-35

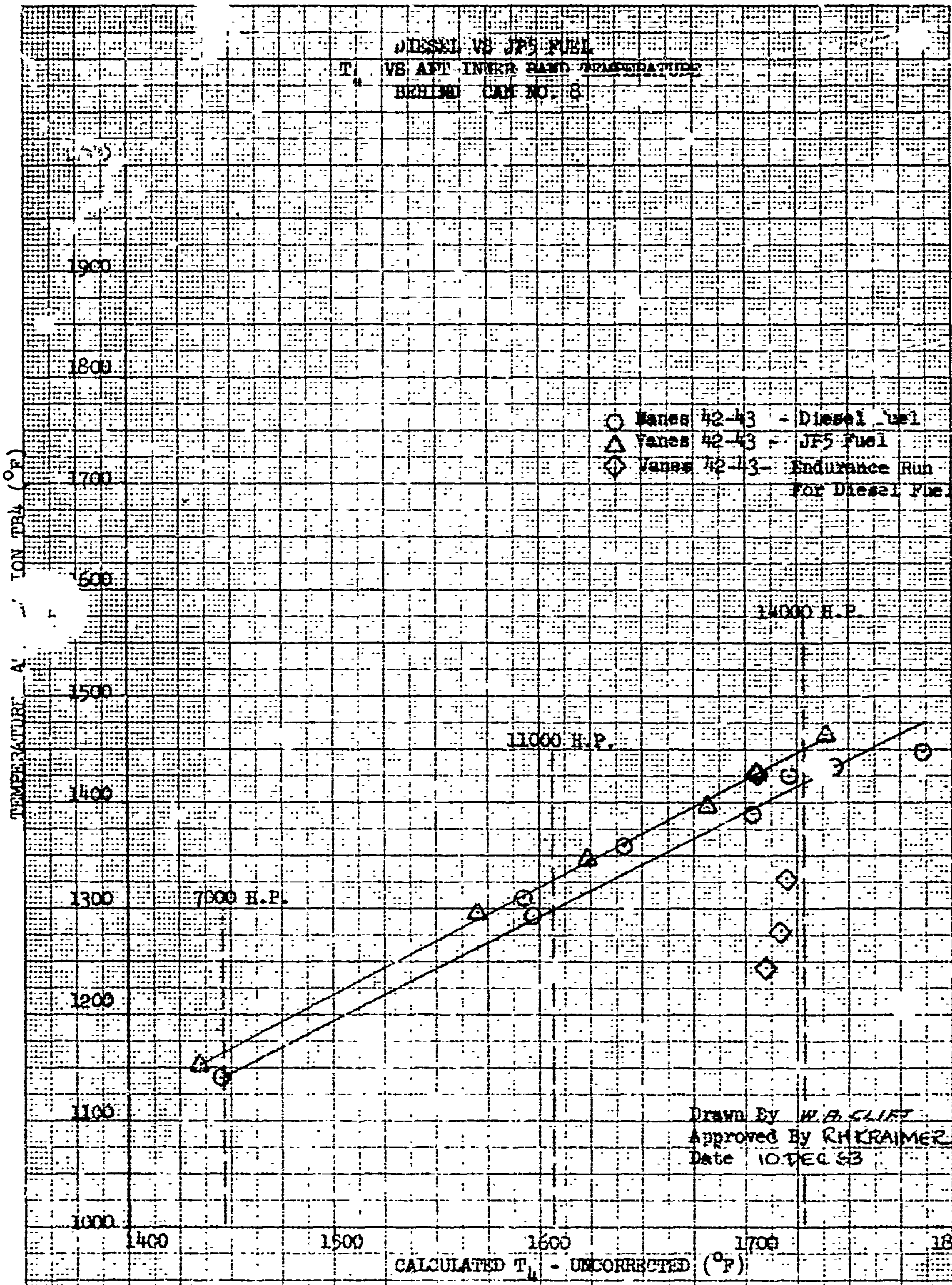


FIGURE NO. 3.5-36

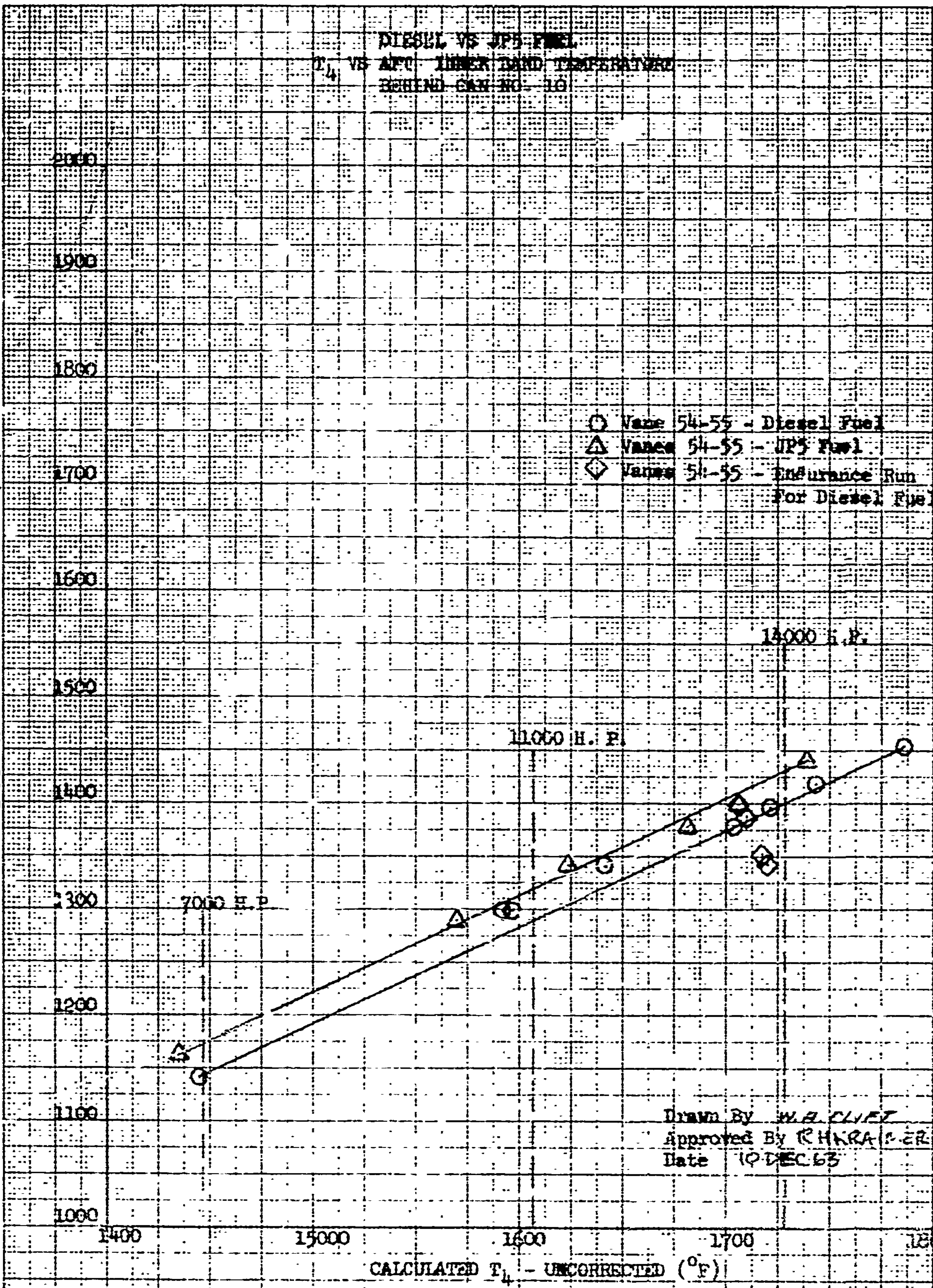


FIGURE NO. 7.5-37

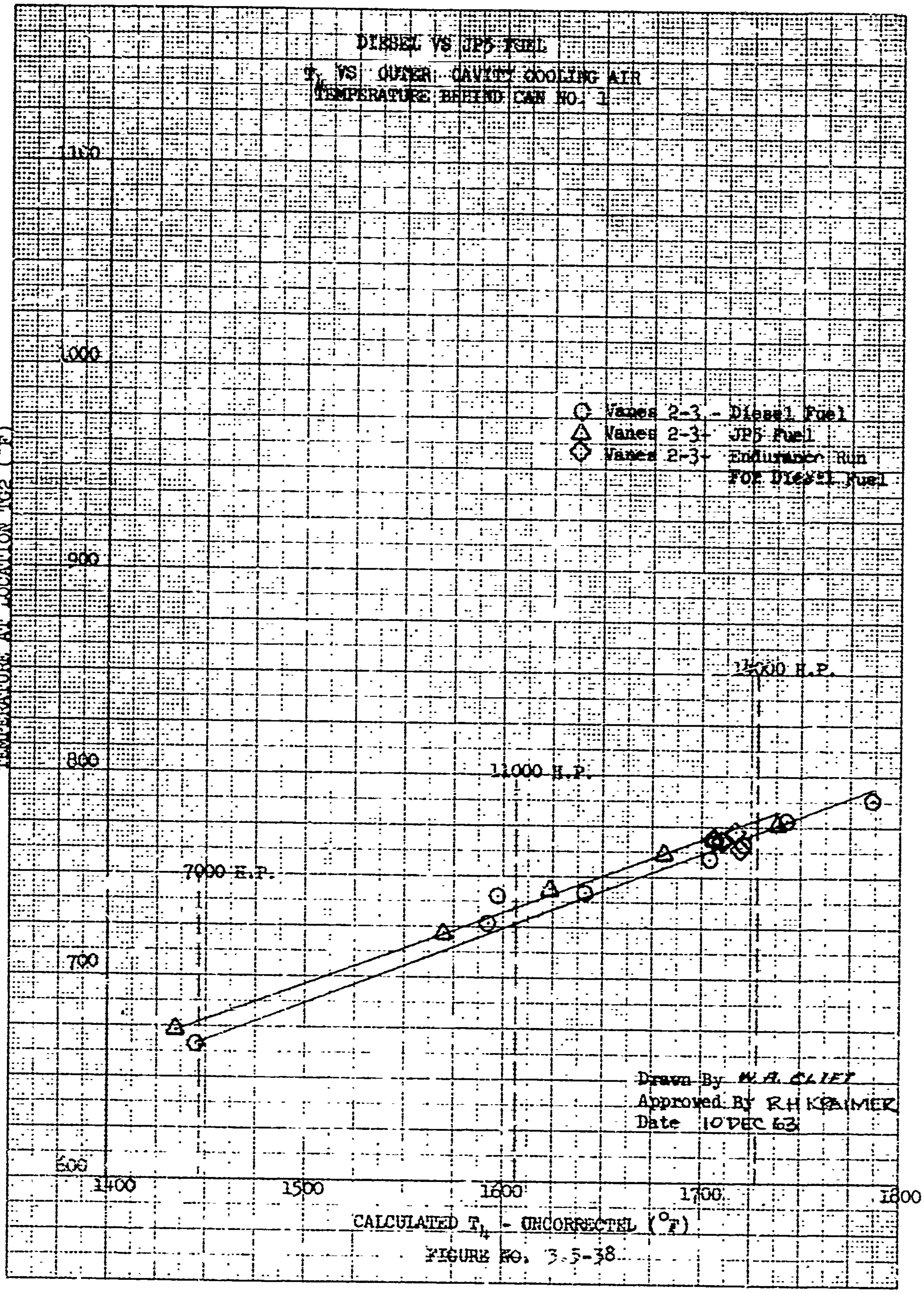


FIGURE NO. 3.5-38

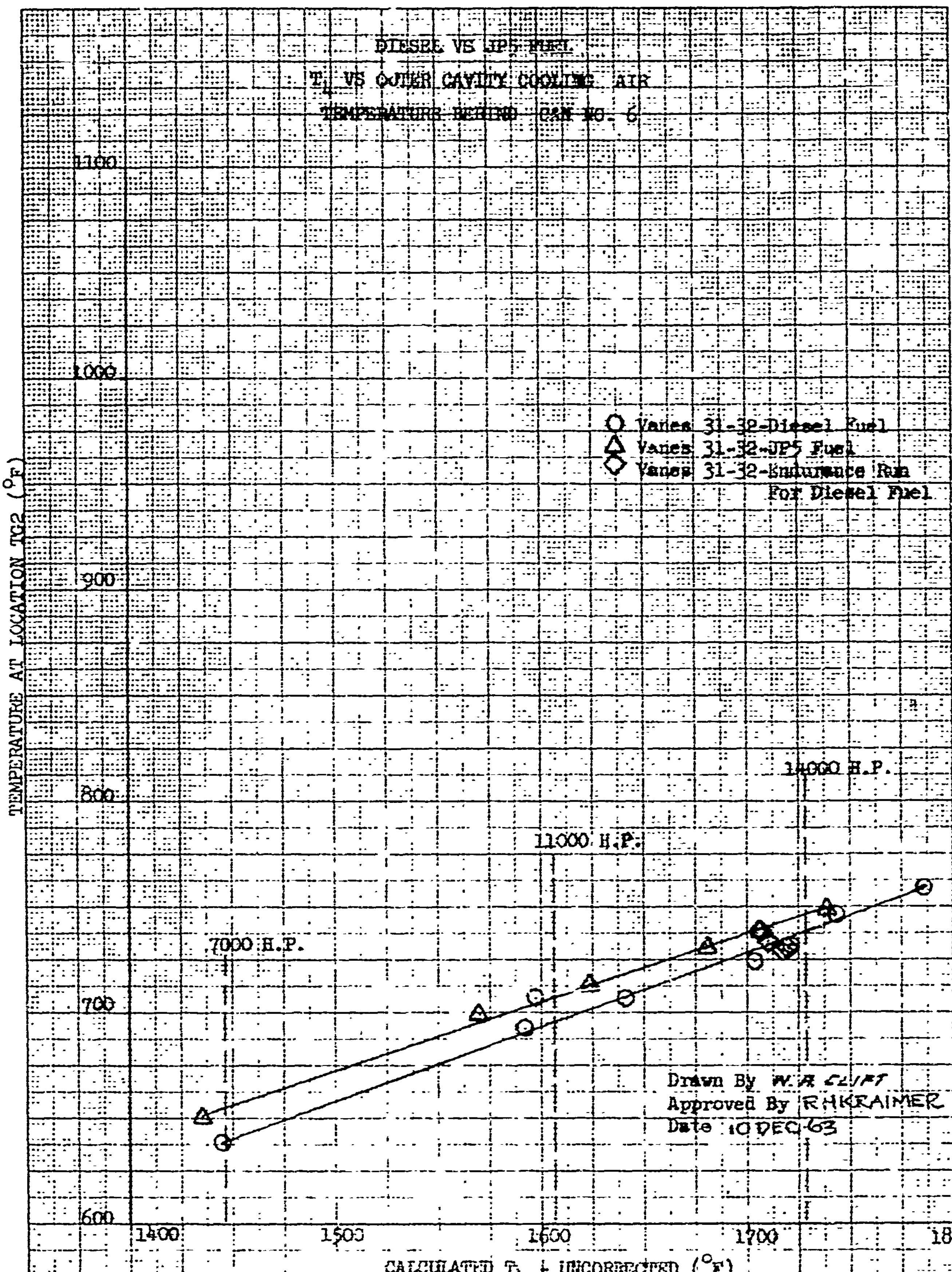


FIGURE NO. 3.5-39

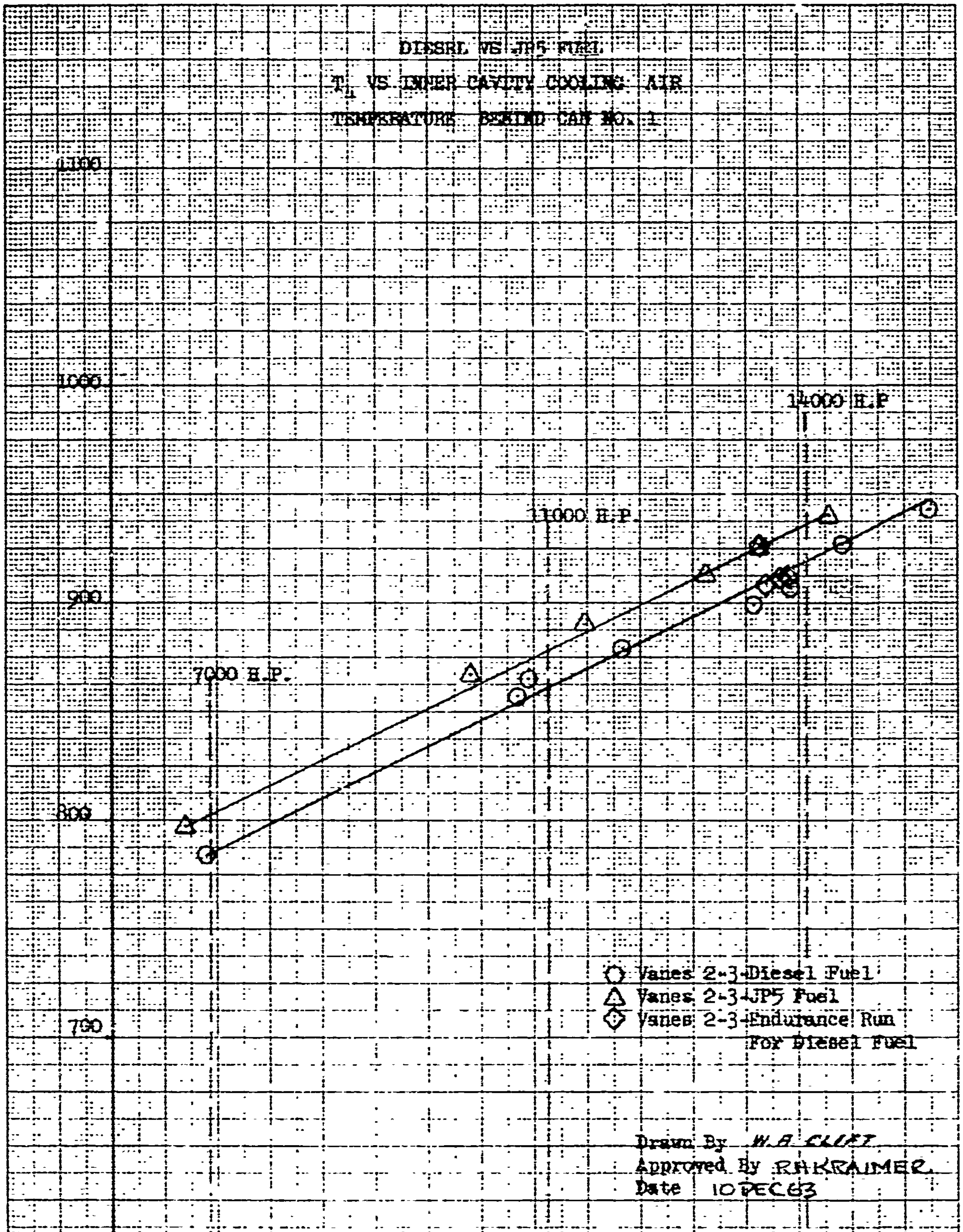
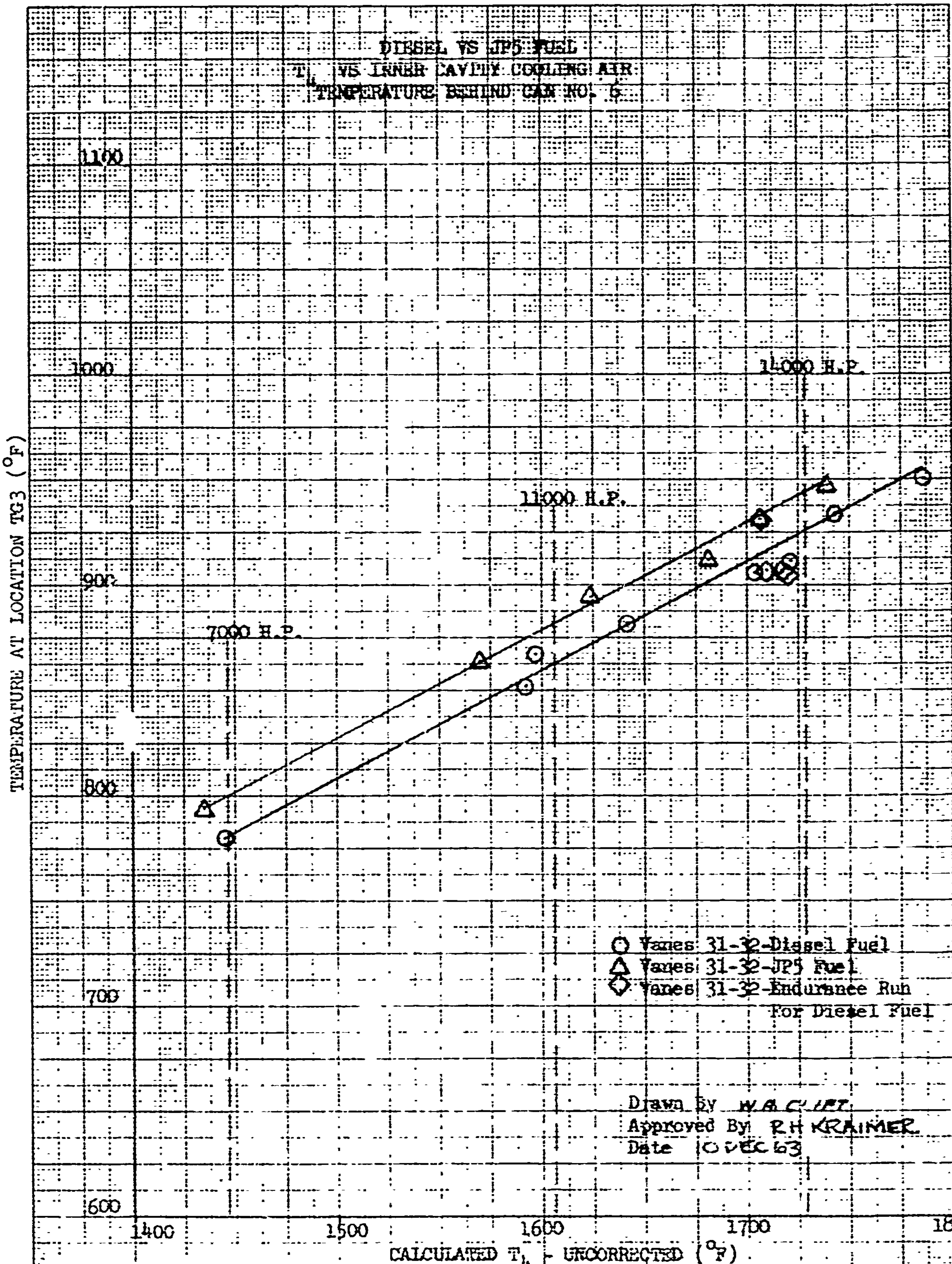


FIGURE NO. 3.5-40



Drawn By W.A. C...
Approved By R H KRAIMER
Date 10 DEC 63

FIGURE NO. 3.5-41

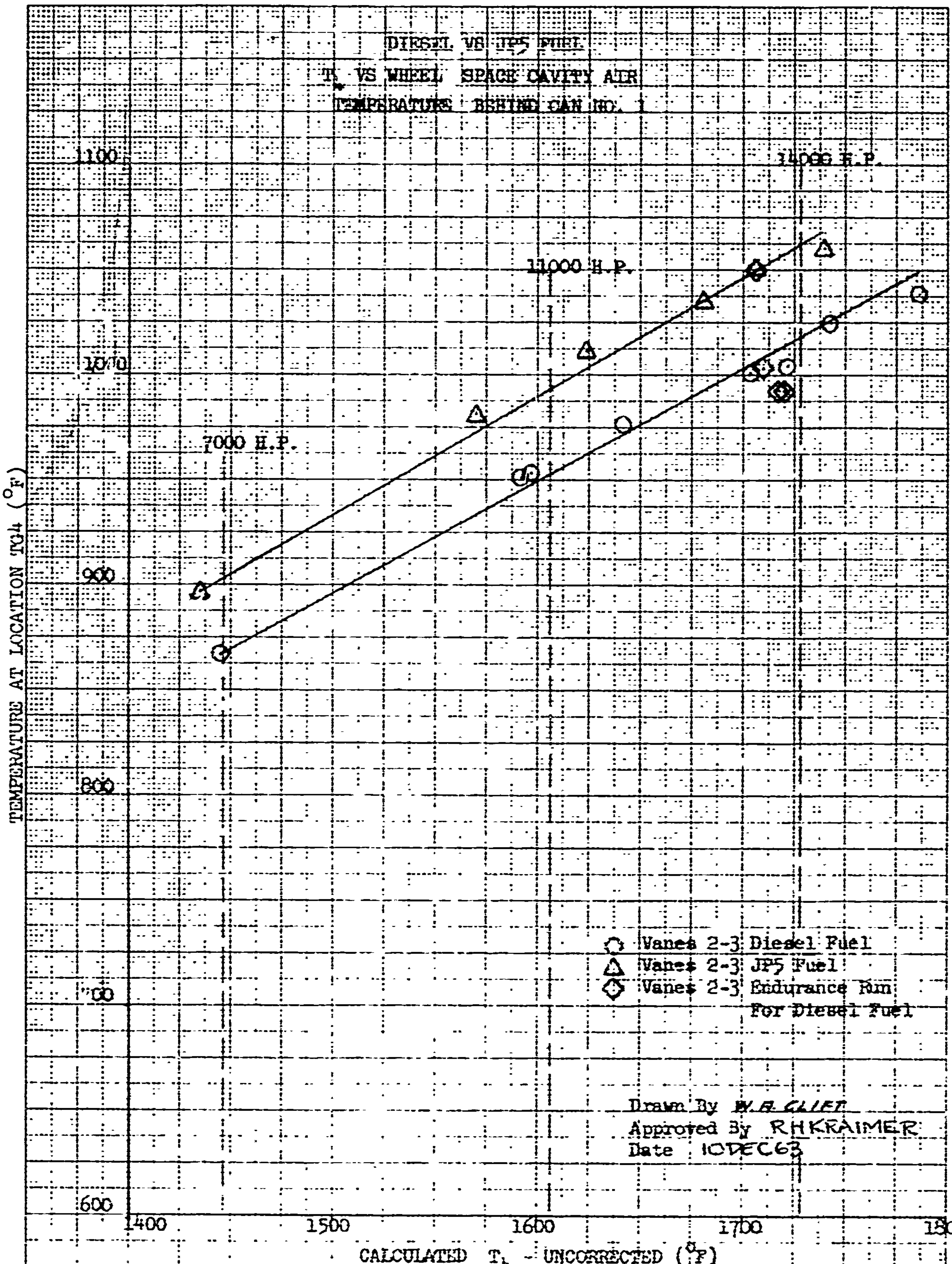


FIGURE NO. 3.5-42

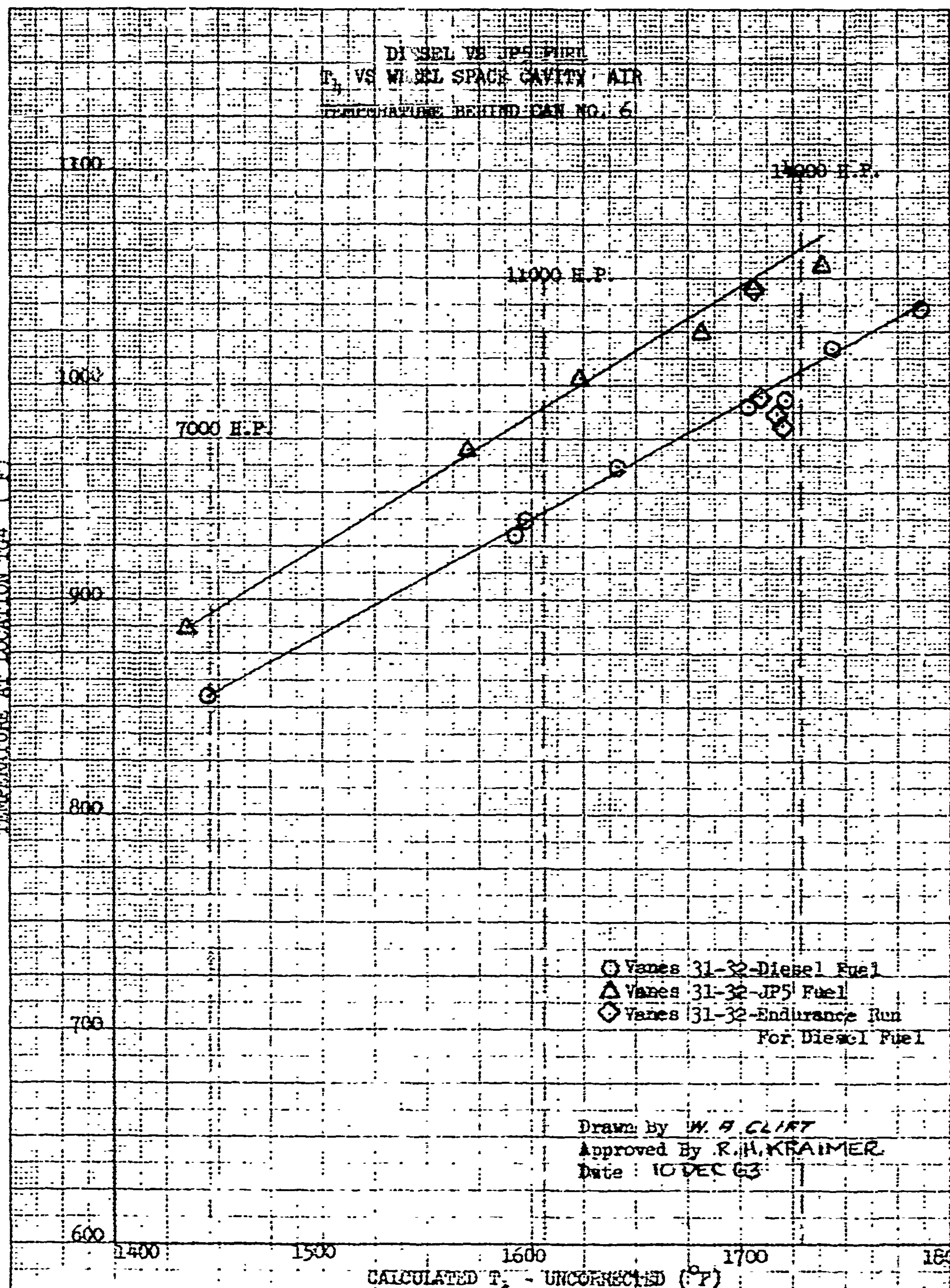


FIGURE NO. 3.5-43

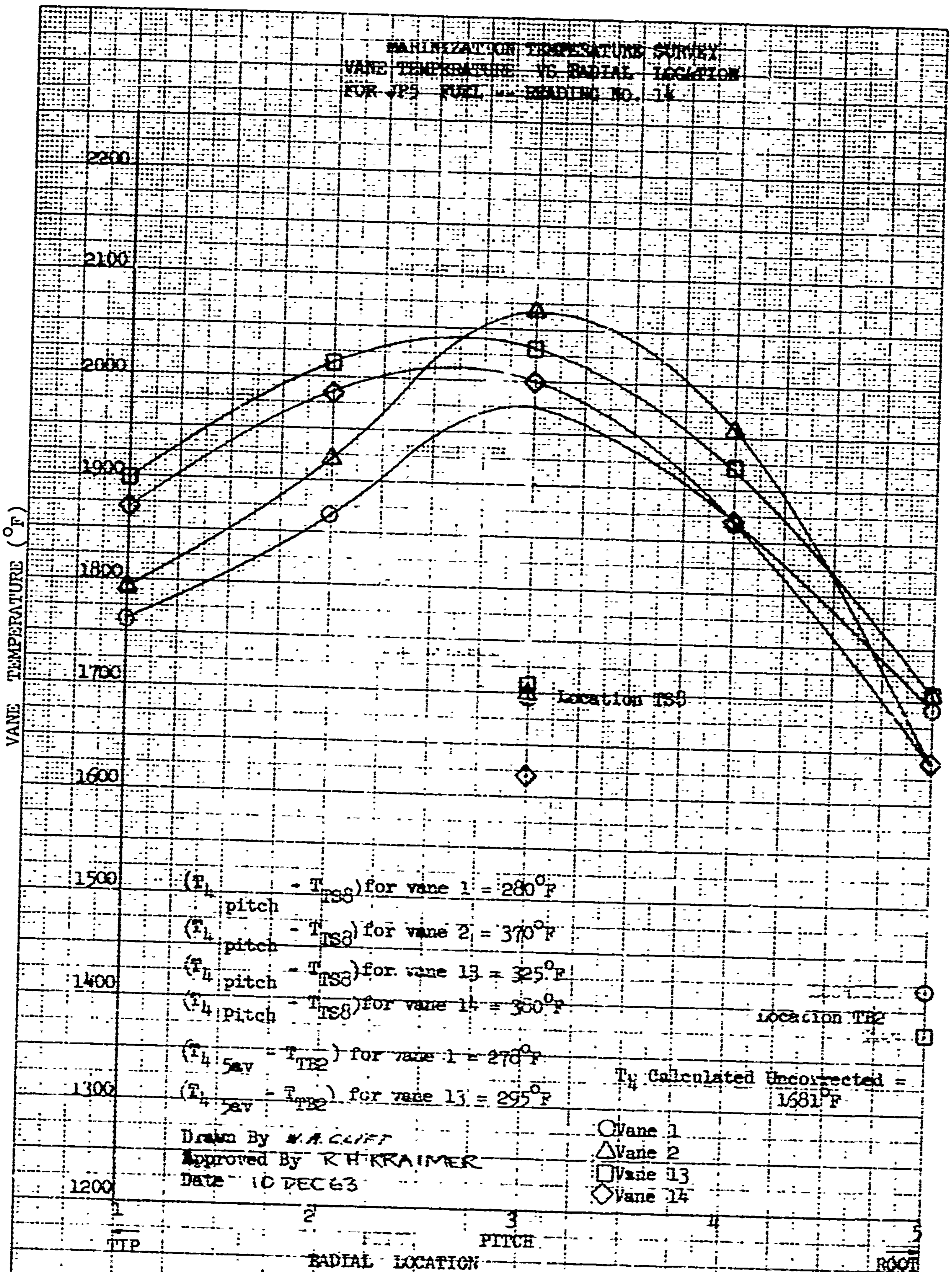
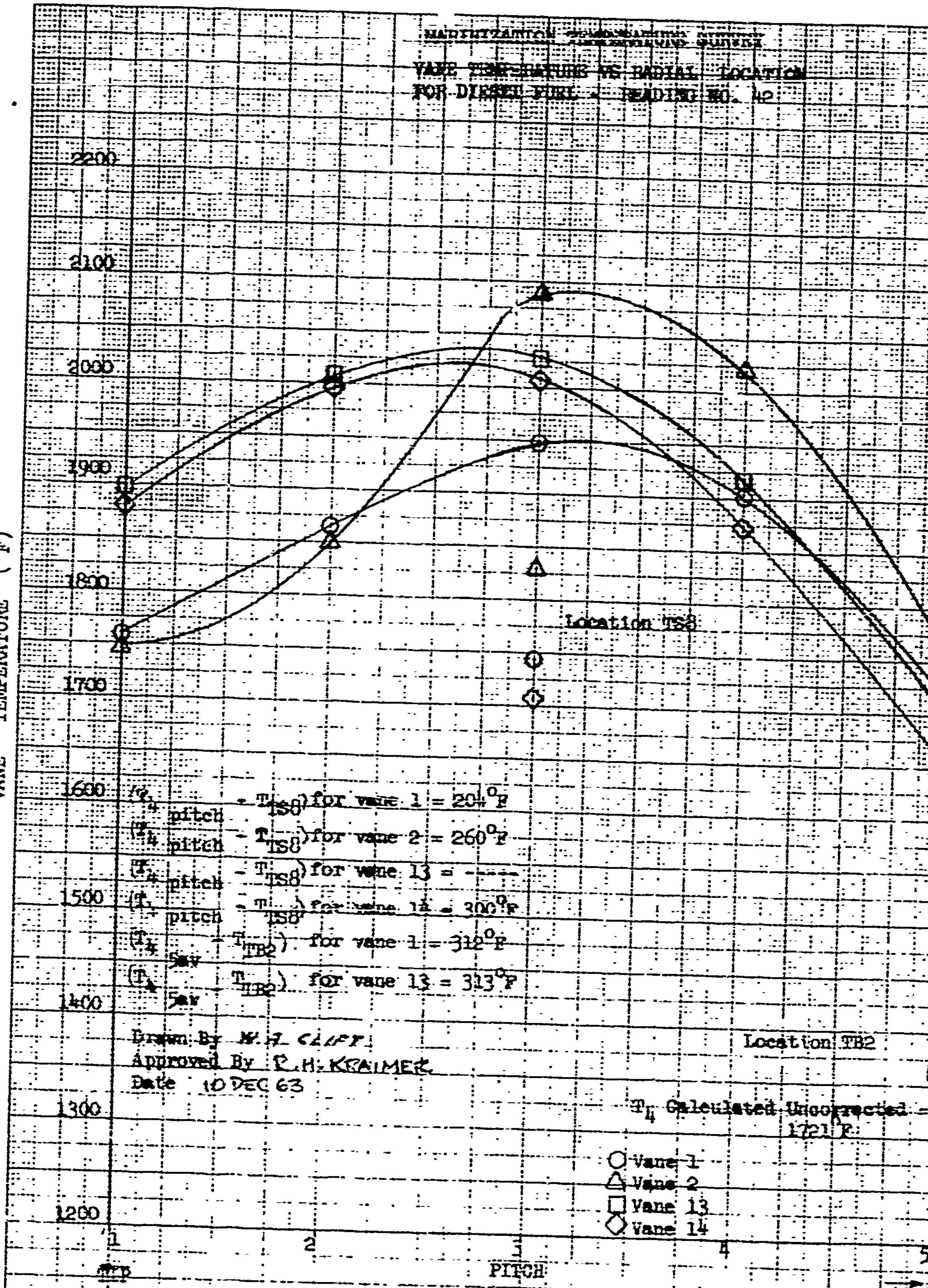


FIGURE NO. 3.5-44



RADIAL LOCATION

FIGURE NO. 3.5-45

LOCATION	CAN NO.	VANE NO.	TEMPERATURE					
			7000 H. P.		11000 H.P.		14000 H.P.	
			JP5	DIESEL	JP5	DIESEL	JP5	DIESEL
Vane Leading Edge	2	7	1425	1374	1598	1526	1728	1642
	2	8	1424	1373	1567	1500	[illegible]	1598
	4	20	1303	1284	1454	1428	1567	1538
	6	31	1232	1280	1444	1450	1610	1578
	6	32	1315	1282	1453	1431	1558	1545
	8	42	1374	1356	1548	1532	1680	1666
	8	43	1370	1362	1535	1527	1661	1651
	10	54	1393	1375	1582	1536	1725	1660
	10	55	1307	1282	1479	1400	1610	1490
Vane Trailing Edge	1	1	1437	1402	1616	1600	1751	1751
	1	2	1351	1442	1599	1678	1856	1786
	2	7	1532	1501	1717	1665	1858	1790
	2	8	1513	1475	1722	1670	1881	1817
	3	14	1370	1385	1550	1580	1685	1727
	4	19	1502	1445	1667	1616	1792	1745
	6	31	1370	1353	1550	1541	1688	1684
	6	32	1355	1359	1539	1525	1681	1652
	8	42	1455	1485	1640	1665	1780	1805
	8	43	1445	1432	1630	1615	1770	1755
	10	54	1462	1394	1665	1588	1813	1735
Aft Inner Band(TB1)	2	7	1271	1227	1484	1425	1645	1580
	6	31	1173	1160	1350	1320	1485	[illegible]
	8	42	1200	1158	1353	1307	1470	1420
	10	54	1170	1144	1315	1310	1425	1440
Aft Inner Band (TB2)	1	1-2	1184	1180	1342	1315	1464	1420
	2	7-8	1220	1220	1450	1420	1625	1570
	3	13-14	1155	1130	1308	1271	1425	1380
	4	19-20	1160	1142	1335	1295	1467	1411
	6	31-32	1155	1139	1320	1302	1445	1427
	10	54-55	1155	1120	1295	1274	1405	1390

Figure 3.5-46

LOCATION	CAN NO.	VANE NO.	TEMPERATURE					
			7000 H.P.		11000 H.P.		14000 H.P.	
			JP5	DIESEL	JP5	DIESEL	JP5	DIESEL
Aft Inner Band (TB3)	2	8	1175	1182	1400	1365	1570	1510
	4	20	1085	1052	1235	1200	1350	1313
	6	32	1122	1109	1275	1260	1392	1375
	8	43	1155	1133	1320	1306	1446	1437
Aft Inner Band (TB4)	6	31-32	1184	1155	1349	1325	1475	1454
	8	42-43	1165	1140	1325	1298	1450	1418
	10	54-55	1172	1143	1320	1289	1430	1400
Outer Cavity	1	2-3	677	667	734	727	778	772
	6	31-32	655	639	707	695	746	738
Inner Cavity	1	2-3	802	785	877	860	935	920
	6	31-32	800	780	882	862	945	925
Wheel Space Cavity	1	2-3	902	867	993	952	1062	1018
	6	31-32	892	855	990	940	1062	1007

Figure 3.5-47

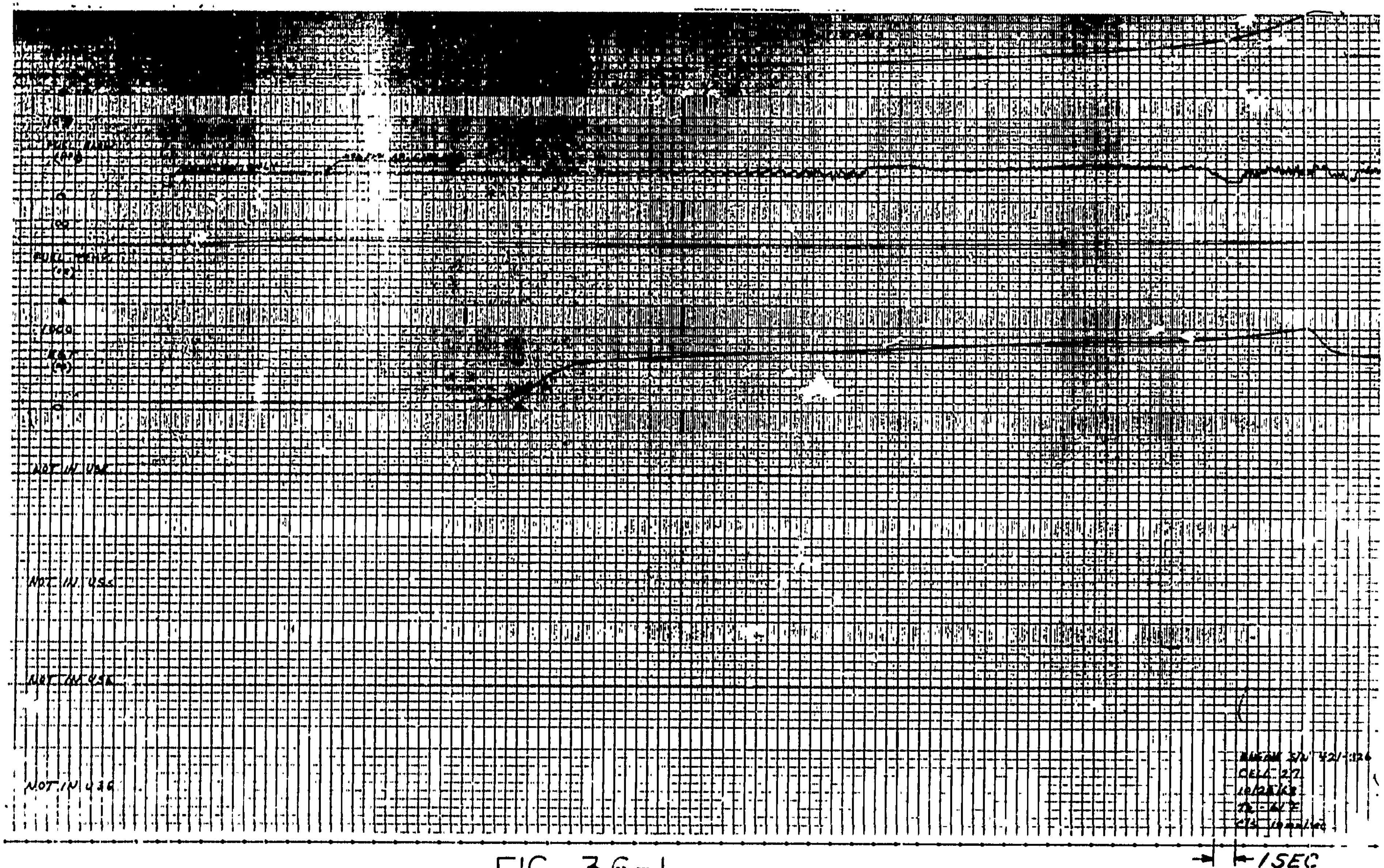


FIG. 3.6-1

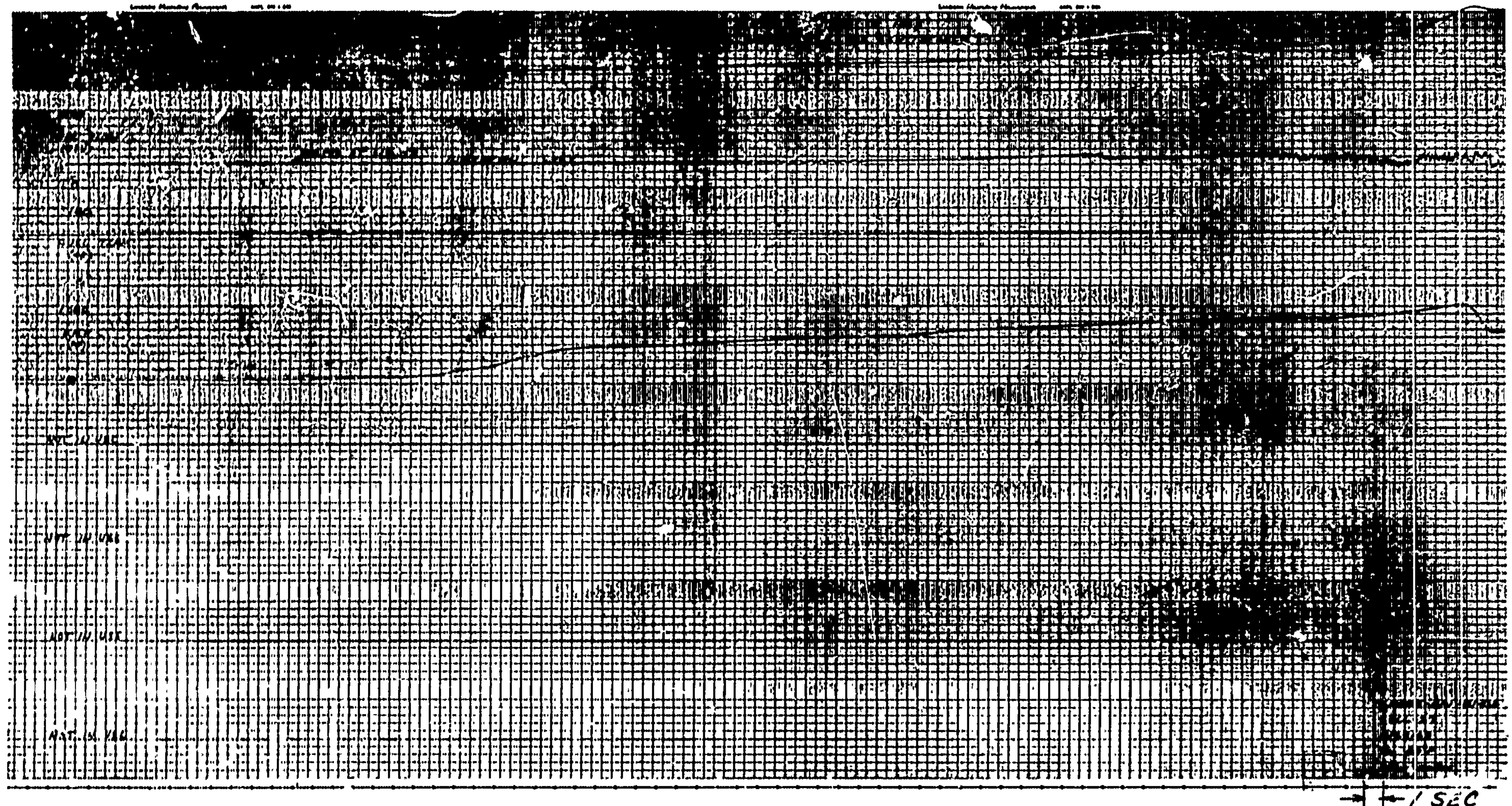


FIG. 3.6-2

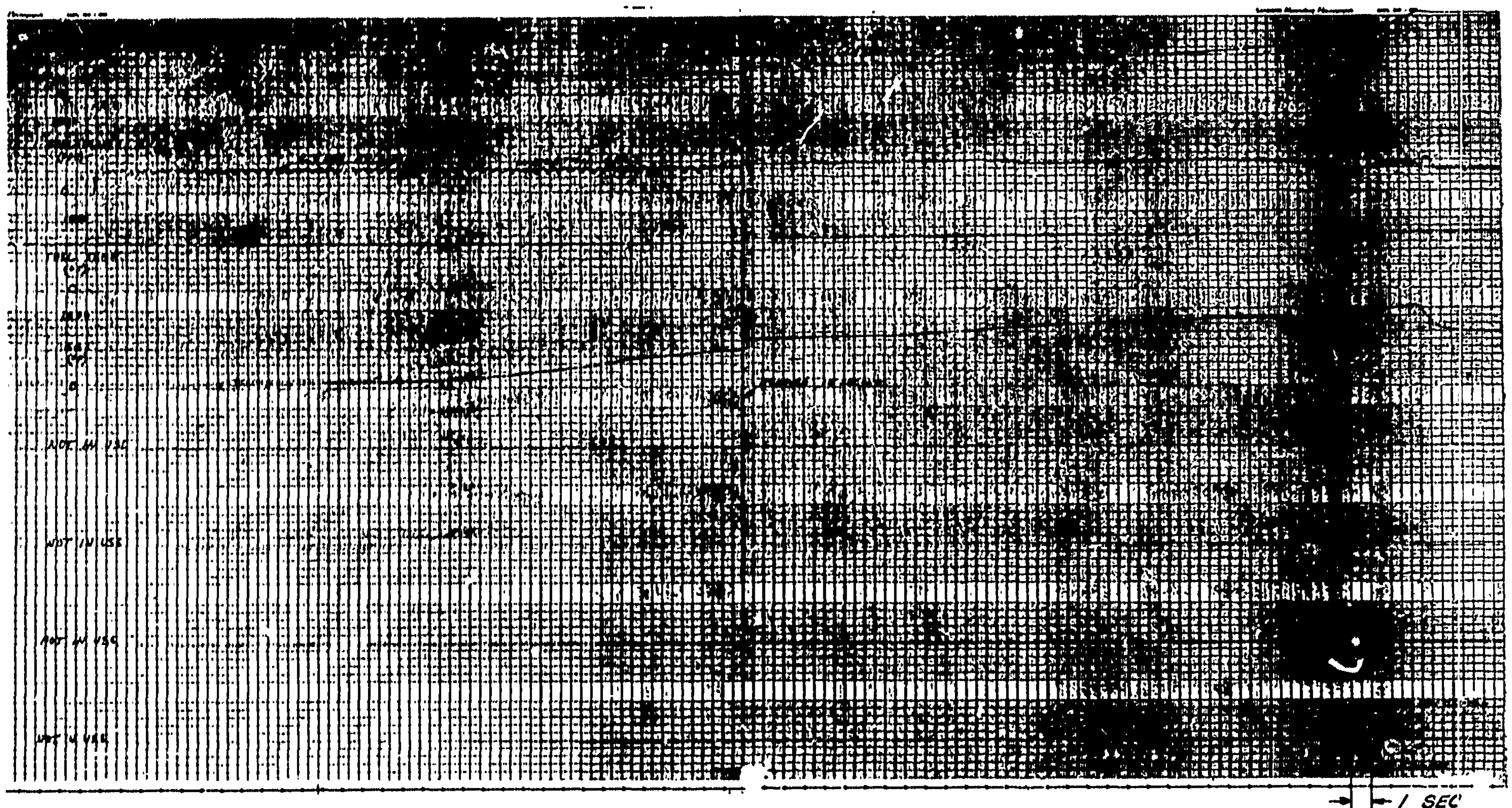


FIG. 3.6-3

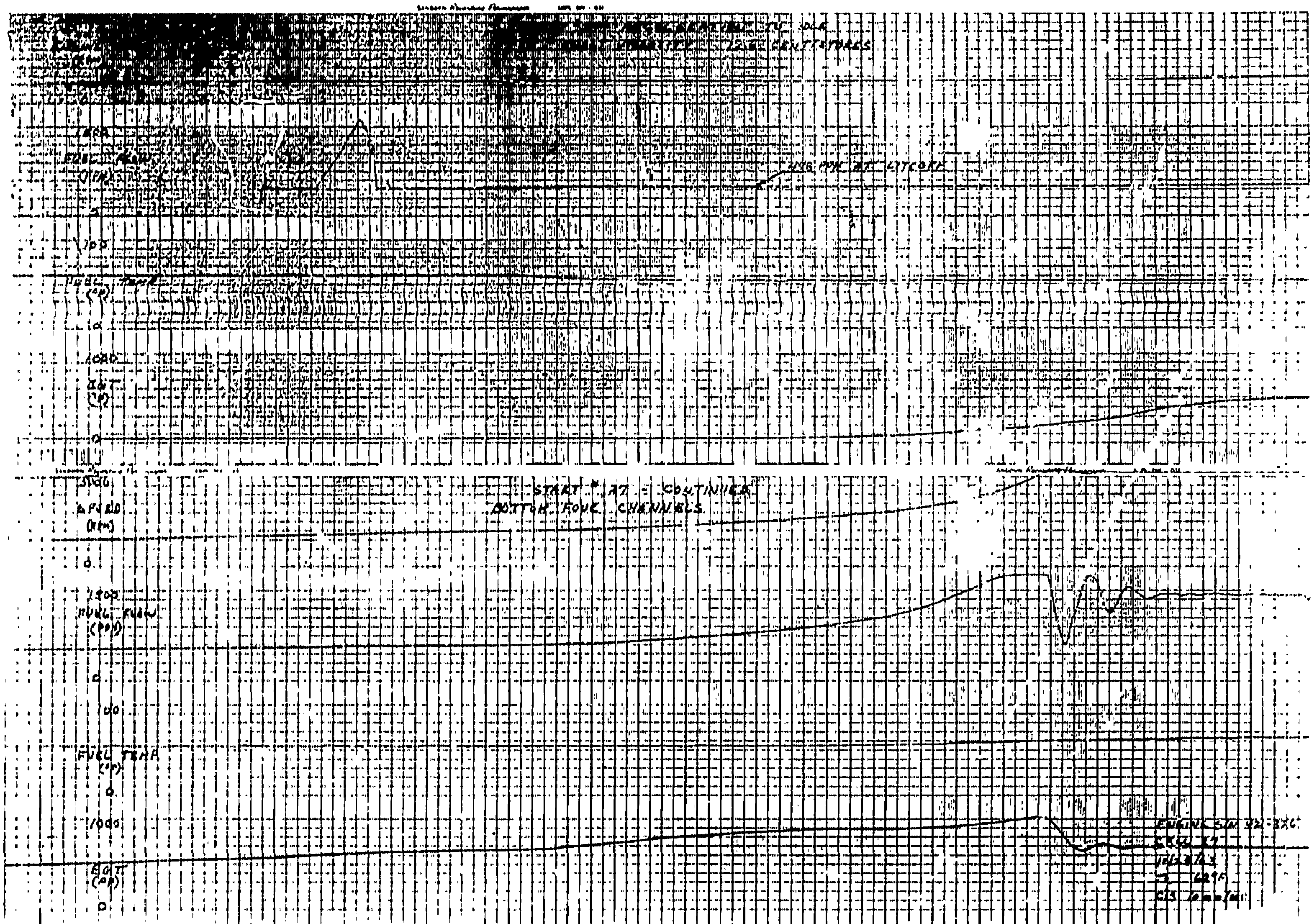
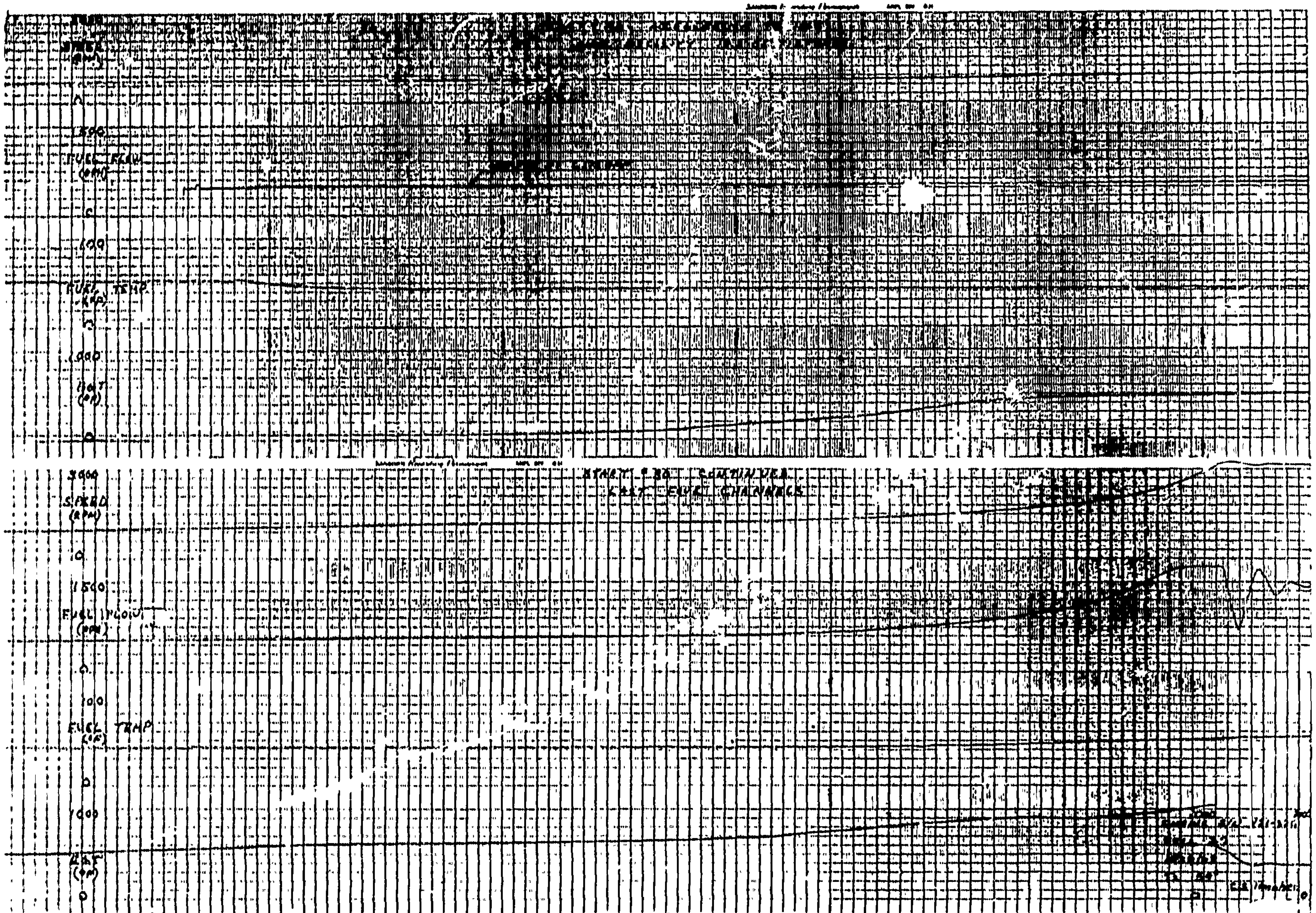

START # A7 - CONTINUED
BOTTOM FOUR CHANNELS
FUEL TEMP
1000
EGT
SPEED
(RPM)
FUEL FLOW
(PPH)
100
1 SEC

FIG. 3.6-4



1500
FUEL FLOW
(PPH)
0
100
FUEL TEMP
0
1000
EGT
(°F)
0
3000
SPEED
(RPM)
0
1500
FUEL FLOW
(PPH)
0
100
FUEL TEMP
(°F)
0
1000
EGT
(°F)
0
1 SEC

FIG. 36-5

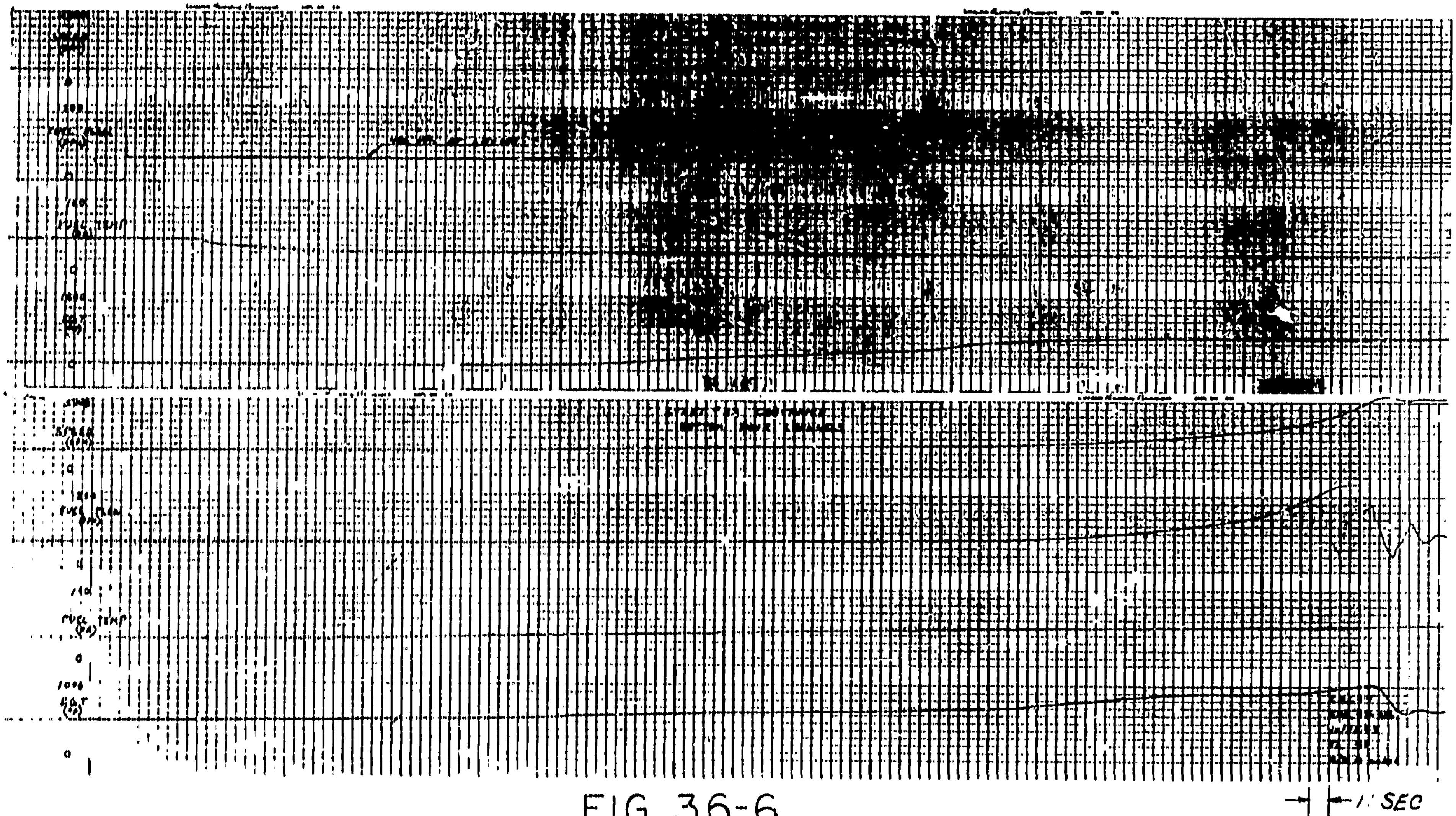


FIG. 3.6-6

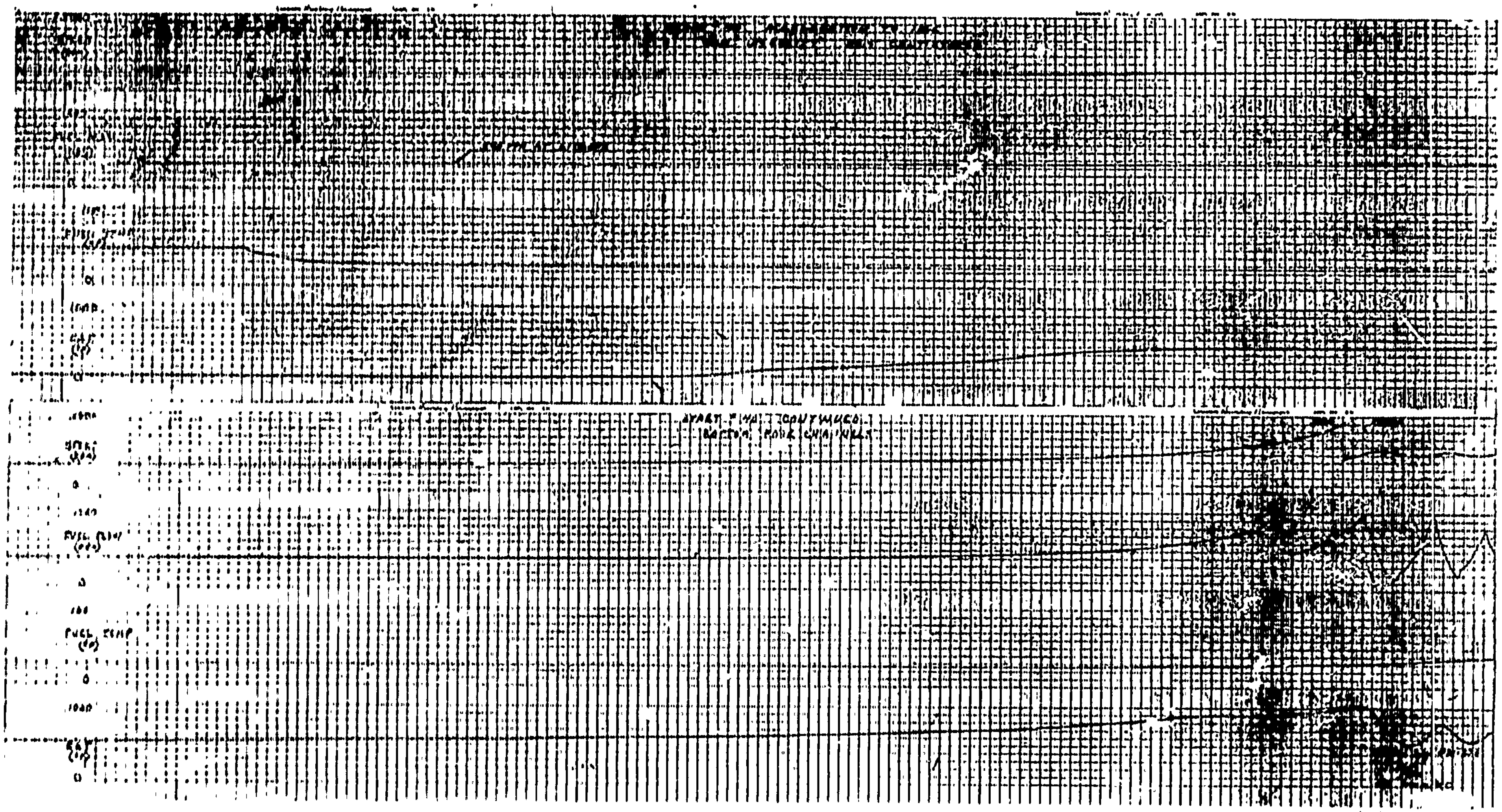


FIG. 3.6-7

START TEST DATA USING DIESEL FUEL

Start No.	Fuel Temp. At Light-Off P & D Valve Outlet (°F)	Viscosity Of Fuel At Light-Off Temperature (Centistokes+)	Fuel Flow At Light-Off* (PPH)	Time From Ignition & Fuel Flow Initiation To Idle Speed (sec)	Time From Fuel Flow & Ignition To Light-Off (Ignition can) (sec)	Time From Light-Off To Idle Speed (sec)	Engine Speed At Light-Off (RPM)	CIT T_2 (°F)
10	74	9.2	495	L/O Only	19.5	L/O Only	1200	60
11	70.5	10.0	500	L/O Only	10.6	L/O Only	1250	63
12	69	10.0	487	L/O Only	11.3	L/O Only	1250	62
13	77	8.9	490	52.6	9.6	43.0	1230	61
14	68	10.2	480	L/O Only	19.9	L/O Only	1200	61
15	68	10.2	486	L/O Only	11.7	L/O Only	1230	60
16	67	10.2	474	70.3	12.8	57.5	1230	60
17	61	12.0	465	L/O Only	12.4	L/O Only	1230	61
18	N O	F U E L	F L O W	R E A D O U T	O N S A N B O R N			
19	60	12.2	450	L/O Only	10.3	L/O Only	1250	59
20	59	12.4	450	80.2	11/2	69	1200	60
21	51	15.2	465	L/O Only	11.0	L/O Only	1230	61
22	42	19.0	450	L/O Only	10.9	L/O Only	1300	62
23	40	19.5	455	-	15.5	**	1200	62
24	45	17.3	455	-	17.8	**	1200	61
25	57	12.8	490	L/O Only	12.5	L/O Only	1250	63
26	56	12.8	489	L/O Only	12.1	L/O Only	1250	64
27	55	12.6	498	89.0	21.2	67.8	1250	62
28	44	17.6	490	L/O Only	13.5	L/O Only	1250	61
29	44	17.6	489	L/O Only	13.4	L/O Only	1250	60
30	43	18.8	489	100.5	12.3	88.2	1230	59
31	36	21.4	495	L/O Only	23.8	L/O Only	1250	59
32	35	22	489	L/O Only	14.2	L/O Only	1230	58
33	33	23	486	138.4	12.6	125.8	1230	58
34	37	20.8	486	182.0	29.0	153.0	1200	55
35	38	20.2	490	L/O Only	19.5	L/O Only	1230	55
36	46	17.0	495	L/O Only	12.9	L/O Only	1250	54
37	38	20.2	488	L/O Only	14.3	L/O Only	1250	56
38	38	20.2	485	L/O Only	14.8	L/O Only	1250	56
39	38	20.2	500	143.7	16.2	127.5	1250	55
40	26	28.7++	540	136.4	16.9	119.5	1200	55

* Measured in control room during motoring.

** Start aborted. Was at 1800 rpm after 63 seconds on start 23 and at 1650 rpm after 50 seconds on start 24 when throttle chopped.

\+ Estimated from viscosity curve

++ Measured test point (average of four)

FIGURE 3.6-8

4.0 ENGINE TEST DATA

4.1 Tabular Data - Turbine Inlet Profile

The following data tabulation on the odd numbered figures show the average turbine inlet temperatures behind the noted combustion liner for the three readings indicated on the top of each page for each of the five thermocouples numbered horizontally on the particular vanes numbered vertically. The data listed under the liner position number along the right edge of each page is the average of the indicated data for the same three readings indicated. The pattern factor is calculated as defined in Section 3.4. Each of the three readings for the tabulated average data is for the engine speed, T_2, and T_5 settings indicated at the top of each page. The thermocouple numbers are in order of increasing immersion into the nozzle annular gas path from the nozzle OD. Refer to Figure 3.1-11 and -12 and Section 2.3 and 2.5

On each of the even numbered figures the turbine inlet temperature profile is plotted as a variation from the average T_4 for the particular engine speed, T_2 and T_5 setting indicated. A T_4 profile as a variation from the average is obtained by plotting the difference from the average T_4 of the average of all of the readings for each thermocouple immersion depth on all thirty nozzle vanes. This difference is then plotted along the right side. The average T_4 is calculated by averaging all T_4 r adings on the preceding data tabulation page.

Figures 4.1.1 thru -26 are for the JP-5 and diesel calibration runs. Figures 4.1-25 thru -50 are for the second and third 10 hour diesel endurance runs. There are no data for the first 10 hour endurance run due to instrumentation difficulties, refer Section 2.5.

4.2 Tabular Data - Combustion Liner and First Stage Nozzle Metal Temperature

The following tabulation is the data for the combustion liner skin temperatures and first stage turbine nozzle metal and cooling air temperatures. Figures 4.2.-2 thru -27 are for the JP-5 and diesel fuel calibration runs. Figure 4.2-28 thru -53 are for the first, second and third 10 hour endurance runs.

The combustion liner skin thermocouple readings are tabulated for liners #4 and #10 as indicated. The liner thermocouple location and numbers are shown on Figure 4.2-1. On the data tabulation, the liner skin thermocouples numbers are listed as "TEMP X-X" at the top of each data tabulation and are identified as follows: (examples taken for Figure 4.2-2).

Liner Can 10 Temp 1-26

	Thermocouple Identification Numbers 1	2 (Thermocouple Identification Numbers Refer Figure 4.2-1)
1	1	2
2	3	4
3	5	6
4	7	8
5	9	10
6	11	12
7	13	14
8	15	16
9	[illegible]	18
10	[illegible]	20
11	[illegible]	22
12	23	24
13	25	26

Liner Can 10 Temp 27-36

	Thermocouple Identification Numbers 1	2 (Thermocouple Identification Numbers Refer Figure 4.2-1)
1	27	28
2	29	30
3	31	32
4	33	34
5	35	36

The serial number of the first stage nozzle partition corresponding to diaphragm temperatures listed are as listed below in Table I where 1-1, 1-2, 1-3 etc. correspond to the respective row and column numbers in the data print out.

	1	2	3	4
1.	7TS2	3TS2	19TS2	20TS2
2.	31TS2	32TS2	42TS2	43TS2
3.	54TS2	55TS2	1TS8	2TS8
4.	7TS8	8TS8	13TS8	14TS8
5.	19TS8	20TS8	31TS8	32TS8
6.	42TS8	43TS8	54TS8	55TS8
7.	7TB1	19TB1	31TB1	42TB1
8.	54TB1	1-2TB2	7-8TB2	13-14TB2
9.	19-20TB2	31-32TB2	42-43TB2	54-55TB2
10.	8TB3	20TB3	32TB3	43TB3
11.	55TB3	7-8TB4	19-20TB4	31-32TB4
12.	42-43TB4	54-55TB4	2-3TG3	31-32TB3
13.	2-3G4	31-32TG4	2-3TG2	31-32TG2

TABLE I

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 02386B

RDG 2,3,4,6900 RPM,T2-77.0,T5-920,JP-5 FUEL,10-15-63
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1410.	1488.	1545.	1537.	1521.
1	1510.	1590.		1568.	1422.
2	1556.	1646.	1712.	1617.	1419.
3	1557.	1668.	1661.	1587.	
4	1555.	1615.	1644.	1656.	1645.
5	1189.	1343.	1428.	1484.	1548.
0					
AVG.	1463.	1559.	1602.	1575.	1511.

LINER POS. 1

AVG. T4 = 1541.
AVG. T3 = 631.
PATTERN FAC.= 0.188
AVGT4-T3 = 910.
MAXT4-AVGT4 = 171.

VANE	1	2	3	4	5
11	1286.	1441.	1555.	1605.	1611.
12	1436.	1556.	1576.	1526.	1449.
13	1554.	1635.	1644.	1567.	1423.
14	1543.	1649.	1671.	1587.	1409.
15	1363.	1538.	1592.	1548.	1476.
16	1323.	1439.	1521.	1566.	1584.
0					
AVG.	1418.	1543.	1593.	1566.	1492.

LINER POS. 3

AVG. T4 = 1523.
AVG. T3 = 631.
PATTERN FAC.= 0.167
AVGT4-T3 = 892.
MAXT4-AVGT4 = 149.

VANE	1	2	3	4	5
23	1466.	1563.	1670.	1685.	1671.
24	1484.	1605.	1666.	1628.	1493.
25	1432.	1548.	1661.	1629.	1466.
26	1447.	1604.	1635.	1568.	1424.
27	1365.	1510.	1526.	1473.	1406.
28	1191.	1307.	1404.	1470.	1520.
0					
AVG.	1397.	1523.	1594.	1575.	1497.

LINER POS. 5

AVG. T4 = 1517.
AVG. T3 = 631.
PATTERN FAC.= 0.189
AVGT4-T3 = 886.
MAXT4-AVGT4 = 168.

VANE	1	2	3	4	5
34	1259.	1392.	1483.	1590.	1702.
35	1277.	1484.	1587.	1598.	1574.
36	1508.	1652.	1689.	1693.	1584.
37	1688.	1740.	1749.	1656.	1467.
38	1562.	1673.	1625.	1495.	1348.
39	1424.	1470.	1490.	1483.	1454.
0					
AVG.	1453.	1569.	1604.	1586.	1522.

LINER POS. 7

AVG. T4 = 1547.
AVG. T3 = 631.
PATTERN FAC.= 0.221
AVGT4-T3 = 916.
MAXT4-AVGT4 = 202.

VANE	1	2	3	4	5
46	1398.	1560.	1607.	1647.	1679.
47	1457.	1591.	1654.	1609.	1503.
48	1467.	1593.	1698.	1616.	1439.
49	1514.	1567.	1645.	1537.	1349.
50	1384.	1510.		1559.	1513.
51	1305.	1460.	1555.	1640.	1694.
0					
AVG.	1421.	1547.	1632.	1601.	1529.

LINER POS. 9

AVG. T4 = 1543.
AVG. T3 = 631.
PATTERN FAC.= 0.170
AVGT4-T3 = 912.
MAXT4-AVGT4 = 155.

Figure 4.1-1

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q23868

RDG 2,3,4,6900 RPM,T2-77.0,T5-920,JP-5 FUEL,10-15-63

INTEGRATED RADIAL PROFILE PLOTS

LINER POS.   1,3,5,7,9

```
          -200      -120        -40    0    40        120       200    ROW
DIFF.     +.........+.........+.........+.........+.........+     AVERAGE
                                       1
-103.5               *                 1                              1430.5
                                       1
                                       1
  14.1                                 1 *                            1548.0
                                       1
                                       1
  70.2                                 1      *                       1604.1
                                       1
                                       1
  46.9                                 1    *                         1580.8
                                       1
                                       1
 -23.7                               * 1                              1510.2
                                       1
          +.........+.........+.........+.........+.........+
          -200      -120        -40    0    40        120       200
```

```
AVG. TT4 = 1533.9          TT3 =  631.0          DELTA T =   902.9
MAX. TT4 = 1749.0            PATTERN FACTOR =    0.238
AVG PATTERN FACTOR= 0.187   AVG INTERGRATED PATTERN FACTOR = 0.187
```

```
          -200      -120        -40    0    40        120       200    ROW
DIFF.     +.........+.........+.........+.........+.........+     AVERAGE
                                       1
  -0.                                  *
                                       1
                                       1
  -0.                                  *
                                       1
                                       1
  -0.                                  *
                                       1
                                       1
  -0.                                  *
                                       1
                                       1
  -0.                                  *
                                       1
          +.........+.........+.........+.........+.........+
          -200      -120        -40    0    40        120       200
```

```
AVG. TT4 =                 TT3 =  631.0          DELTA T =
MAX. TT4 =     0.            PATTERN FACTOR =    -1.000
```

Figure 4-[illegible]

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

RDG 6,7,8,7100 RPM,T2-77.0,T5-1050,JP-5 FUEL.10-15-63
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5		
58	1554.	1657.	1722.	1718.	1700.	LINER POS.	1
1	1672.	1793.		1744.	1575.		
2	1700.	1816.	1915.	1805.	1566.	AVG. T4 =	1716.
3	1693.	1850.	1877.	1767.		AVG. T3 =	675.
4	1732.	1761.	1770.	1770.	1743.	PATTERN FAC.=	0.191
5	1342.	1529.	1645.	1766.	1877.	AVGT4-T3 =	1042.
0						MAXT4-AVGT4 =	198.
AVG.	1616.	1734.	1786.	1762.	1692.		
11	1403.	1572.	1693.	1752.	1763.	LINER POS.	3
12	1548.	1681.	1724.	1673.	1579.		
13	1670.	1791.	1833.	1762.	1585.	AVG. T4 =	1696.
14	1704.	1822.	1858.	1770.	1572.	AVG. T3 =	675.
15	1532.	1743.	1805.	1739.	1645.	PATTERN FAC.=	0.159
16	1539.	1670.	1771.	1835.	1838.	AVGT4-T3 =	1021.
0						MAXT4-AVGT4 =	162.
AVG.	1566.	1713.	1781.	1755.	1664.		
23	1591.	1681.	1782.	1791.	1762.	LINER POS.	5
24	1570.	1711.	1802.	1769.	1610.		
25	1521.	1667.	1824.	1810.	1625.	AVG. T4 =	1663.
26	1579.	1771.	1820.	1741.	1577.	AVG. T3 =	675.
27	1529.	1708.	1736.	1631.	1605.	PATTERN FAC.=	0.163
28	1316.	1452.	1555.	1633.	1709.	AVGT4-T3 =	988.
0						MAXT4-AVGT4 =	161.
AVG.	1518.	1665.	1753.	1729.	1648.		
34	1388.	1559.	1692.	1853.	1999.	LINER POS.	7
35	1537.	1722.	1843.	1886.	1861.		
36	1657.	1814.	1892.	1937.	1829.	AVG. T4 =	1706.
37	1774.	1852.	1898.	1838.	1644.	AVG. T3 =	675.
38	1628.	1747.	1733.	1623.	1465.	PATTERN FAC.=	0.284
39	1472.	1513.	1533.	1517.	1488.	AVGT4-T3 =	1031.
0						MAXT4-AVGT4 =	293.
AVG.	1576.	1701.	1765.	1775.	1714.		
46	1549.	1730.	1816.	1893.	1962.	LINER POS.	9
47	1616.	1770.	1849.	1811.	1684.		
48	1614.	1754.	1890.	1806.	1601.	AVG. T4 =	1703.
49	1697.	1725.	1808.	1585.	1461.	AVG. T3 =	675.
50	1512.	1648.		1682.	1624.	PATTERN FAC.=	0.252
51	1400.	1561.	1655.	1752.	1818.	AVGT4-T3 =	1028.
0						MAXT4-AVGT4 =	259.
AVG.	1565.	1698.	1804.	1771.	1692.		

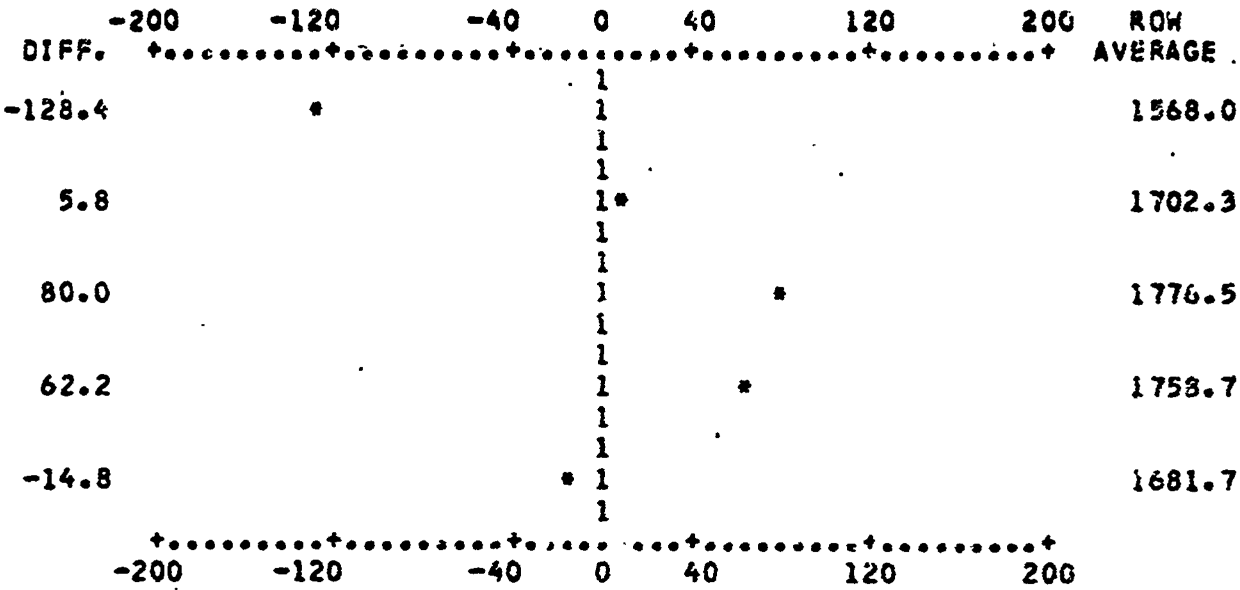
Figure 4.1-3

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

RCG 6,7,8,7100 RPM,T2-77.0,T5-1050,JP-5 FUEL,10-15-63

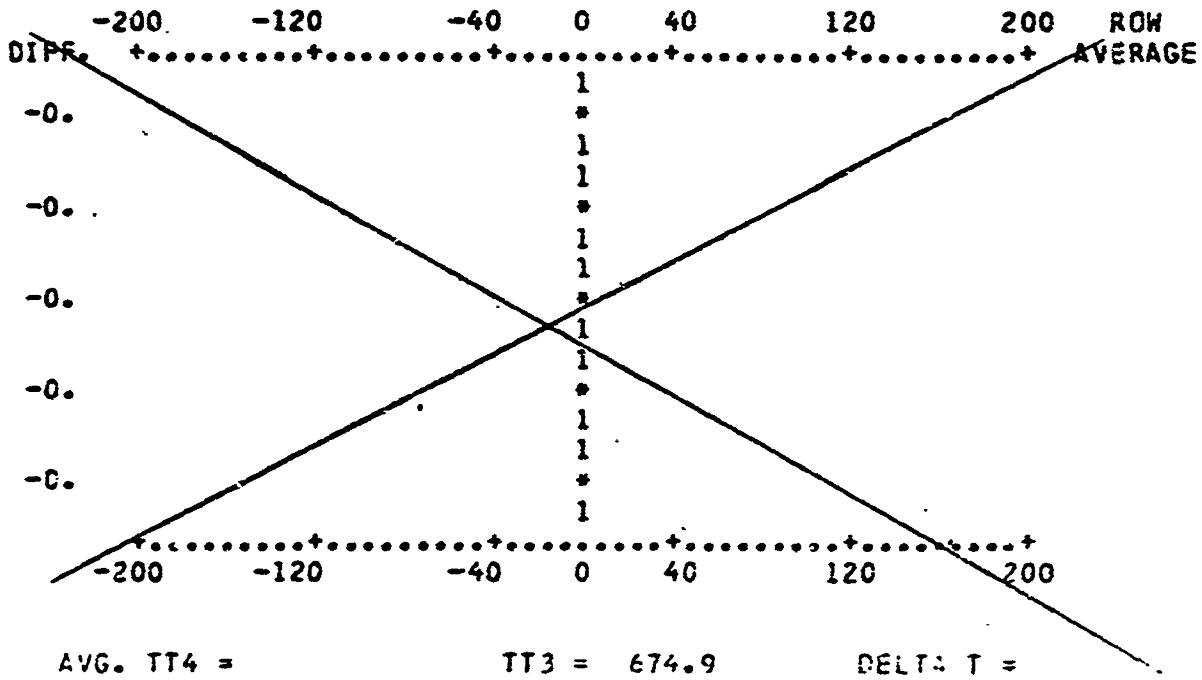
INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9



AVG. TT4 = 1696.5 TT3 = 674.9 DELTA T = 1021.6
MAX. TT4 = 1999.0 PATTERN FACTOR = 0.296
AVG PATTERN FACTOR = 0.210 AVG. INTERGRATED PATTERN FACTOR = 0.211

LINER POS. 2,7.



AVG. TT4 = TT3 = 674.9 DELTA T =
MAX. TT4 = 0. PATTERN FACTOR = -1.000

Figure 4.1-4

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

RCG 10,11,12,7170 RPM,T2-78.5,T5-1095,JP-5 FUEL,10-15-63
TABULATION TT4 THERMOCOUPLES (DEGREES F)

LINER POS. 1

VANE	1	2	3	4	5
58	1556.	1710.	1777.	1778.	1754.
1	1716.	1818.		1805.	1635.
2	1759.	1915.	1995.	1890.	1641.
3	1744.	1918.	1962.	1860.	
4	1792.	1826.	1840.	1853.	1827.
5	1438.	1644.	1778.	1950.	2123.
0					
AVG.	1668.	1805.	1871.	1856.	1796.

AVG. T4 = 1797.
AVG. T3 = 693.
PATTERN FAC.= 0.295
AVGT4-T3 = 1104.
MAXT4-AVGT4 = 326.

LINER POS. 3

VANE	1	2	3	4	5
11	1472.	1660.	1794.	1858.	1849.
12	1617.	1763.	1814.	1756.	1650.
13	1734.	1864.	1914.	1838.	1646.
14	1767.	1890.	1928.	1830.	1628.
15	1584.	1811.	1874.	1805.	1708.
16	1617.	1743.	1846.	1920.	1936.
0					
AVG.	1632.	1788.	1862.	1834.	1736.

AVG. T4 = 1771.
AVG. T3 = 693.
PATTERN FAC.= 0.153
AVGT4-T3 = 1078.
MAXT4-AVGT4 = 165.

LINER POS. 5

VANE	1	2	3	4	5
23	1676.	1740.	1811.	1811.	1782.
24	1597.	1747.	1849.	1827.	1655.
25	1575.	1745.	1908.	1855.	1693.
26	1664.	1861.	1896.	1794.	1616.
27	1594.	1771.	1784.	1687.	1655.
28	1365.	1506.	1623.	1722.	1823.
0					
AVG.	1579.	1728.	1812.	1783.	1704.

AVG. T4 = 1721.
AVG. T3 = 693.
PATTERN FAC.= 0.181
AVGT4-T3 = 1028.
MAXT4-AVGT4 = 187.

LINER POS. 7

VANE	1	2	3	4	5
34	1443.	1630.	1783.	1959.	2120.
35	1623.	1827.	1[illegible]59.	2009.	1980.
36	1710.	1883.	[illegible]	2041.	1934.
37	1809.	1910.	19[illegible].	1924.	1717.
38	1652.	1774.	17[illegible].	1686.	1524.
39	1481.	1523.	1544.	1526.	1493.
0					
AVG.	1620.	1758.	1836.	1858.	1795.

AVG. T4 = 1773.
AVG. T3 = 693.
PATTERN FAC.= 0.321
AVGT4-T3 = 1080.
MAXT4-AVGT4 = 346.

LINER POS. 9

VANE	1	2	3	4	5
46	1615.	1812.	1915.	2008.	2088.
47	1678.	1847.	1941.	1908.	1768.
48	1674.	1814.	1970.	1886.	1675.
49	1745.	1773.	1870.	1747.	1514.
50	1547.	1689.		1726.	1665.
51	1435.	1601.	1695.	1794.	1865.
0					
AVG.	1616.	1756.	1878.	1845.	1763.

AVG. T4 = 1768.
AVG. T3 = 693.
PATTERN FAC.= 0.298
AVGT4-T3 = 1075.
MAXT4-AVGT4 = 321.

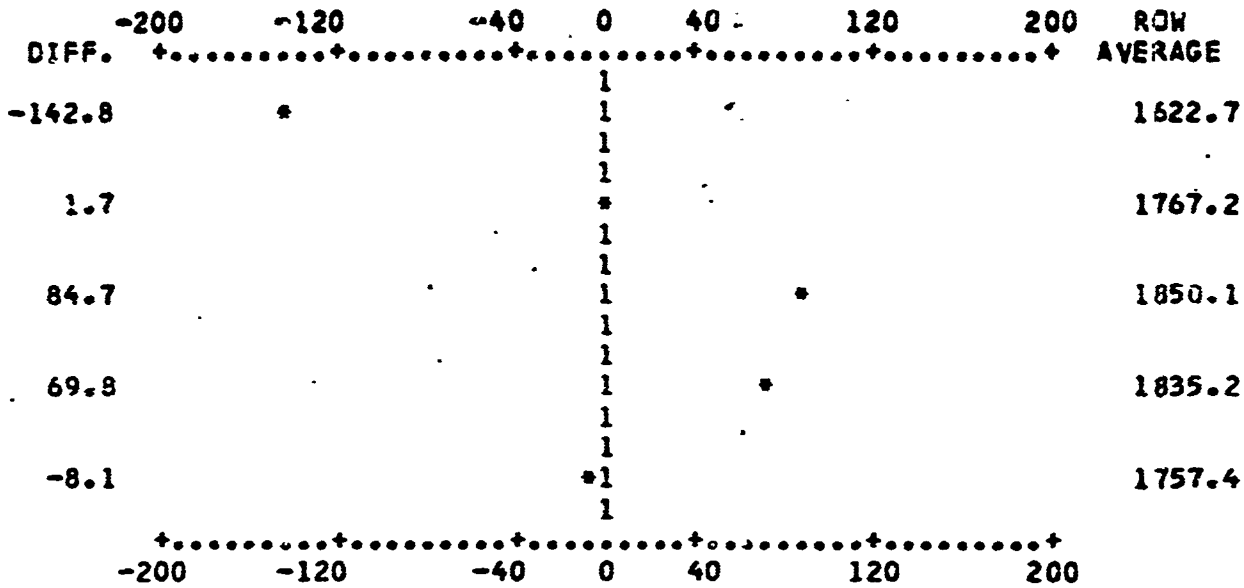
Figure 4.1-5

T4 PROFILE AND PATTERN EVALUATION PROGRAM - C2386B

RDG 10,11,12,7170 RPM,T2-78.5,T5-1095,JP-5 FUEL,10-15-63

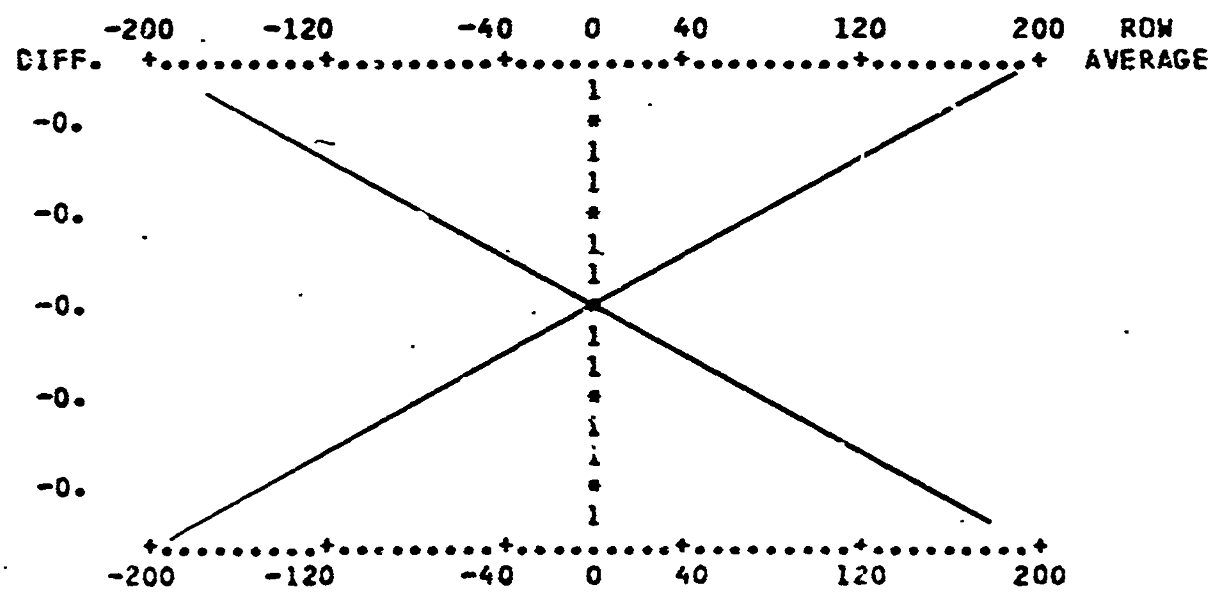
INTEGRATED RADIAL PROFILE PLOTS

LINER POS.   1,3,5,7,9



AVG. TT4 = 1765.4   TT3 = 693.0   DELTA T = 1072.4
MAX. TT4 = 2122.7   PATTERN FACTOR = 0.333

AV3 PATTERN FACTOR = 0.250   AVG INTERGRATED PATTERN FACTOR = 0.251



AVG. TT4 =   TT3 = 693.0   DELTA T =
MAX. TT4 =   PATTERN FACTOR =

Figure 4.1.6

T4 PROFILE AND PATTERN EVALUATION PROGRAM – G2386B

RDG 14,15,16,7246 RPM,T2-79.0,T5-1138,JP-5 FUEL,10-15-63
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1494.	1764.	1841.	1842.	1812.
1	1762.	1866.		1867.	1692.
2	1793.	1920.	2067.	1957.	1705.
3	1792.	1977.	2033.	1935.	
4	1852.	1888.	1903.	1920.	1885.
5	1493.	1713.	1857.	2041.	2224.
0					
AVG.	1698.	1855.	1940.	1927.	1864.

LINER POS. 1

AVG. T4 =	1854.
AVG. T3 =	709.
PATTERN FAC.=	0.323
AVGT4-T3 =	1145.
MAXT4-AVGT4 =	370.

VANE	1	2	3	4	5
11	1579.	1802.	1985.	2066.	2048.
12	1774.	1941.	1975.	1879.	1739.
13	1898.	2014.	2031.	1919.	1702.
14	1870.	1985.	2000.	1870.	1640.
15	1619.	1832.	1856.	1753.	1631.
16	1576.	1664.	1739.	1783.	1781.
0					
AVG.	1719.	1873.	1931.	1879.	1757.

LINER POS. 3

AVG. T4 =	1832.
AVG. T3 =	709.
PATTERN FAC.=	0.209
AVGT4-T3 =	1123.
MAXT4-AVGT4 =	234.

VANE	1	2	3	4	5
23	1698.	1778.	1861.	1866.	1836.
24	1694.	1847.	1933.	1894.	1703.
25	1674.	1852.	2005.	1900.	1744.
26	1735.	1959.	1960.	1844.	1671.
27	1640.	1834.	1852.	1760.	1731.
28	1410.	1566.	1686.	1767.	1851.
0					
AVG.	1642.	1806.	1883.	1838.	1757.

LINER POS. 5

AVG. T4 =	1785.
AVG. T3 =	709.
PATTERN FAC.=	0.204
AVGT4-T3 =	1076.
MAXT4-AVGT4 =	220.

VANE	1	2	3	4	5
34	1479.	1689.	1858.	2057.	2270.
35	1679.	1900.	2057.	2138.	2102.
36	1702.	1893.	2036.	2147.	2043.
37	1818.	1950.	2039.	2018.	1803.
38	1669.	1802.	1822.	1741.	1568.
39	1488.	1537.	1566.	1546.	1513.
0					
AVG.	1639.	1795.	1896.	1941.	1883.

LINER POS. 7

AVG. T4 =	1831.
AVG. T3 =	709.
PATTERN FAC.=	0.391
AVGT4-T3 =	1122.
MAXT4-AVGT4 =	439.

VANE	1	2	3	4	5
46	1691.	1898.	2019.	2129.	2219.
47	1750.	1936.	2041.	2004.	1846.
48	1741.	1878.	2048.	1961.	1740.
49	1773.	1812.	1924.	1797.	1550.
50	1579.	1727.		1754.	1687.
51	1461.	1624.	1710.	1811.	1899.
0					
AVG.	1666.	1813.	1948.	1909.	1823.

LINER POS. 9

AVG. T4 =	1828.
AVG. T3 =	709.
PATTERN FAC.=	0.350
AVGT4-T3 =	1119.
MAXT4-AVGT4 =	391.

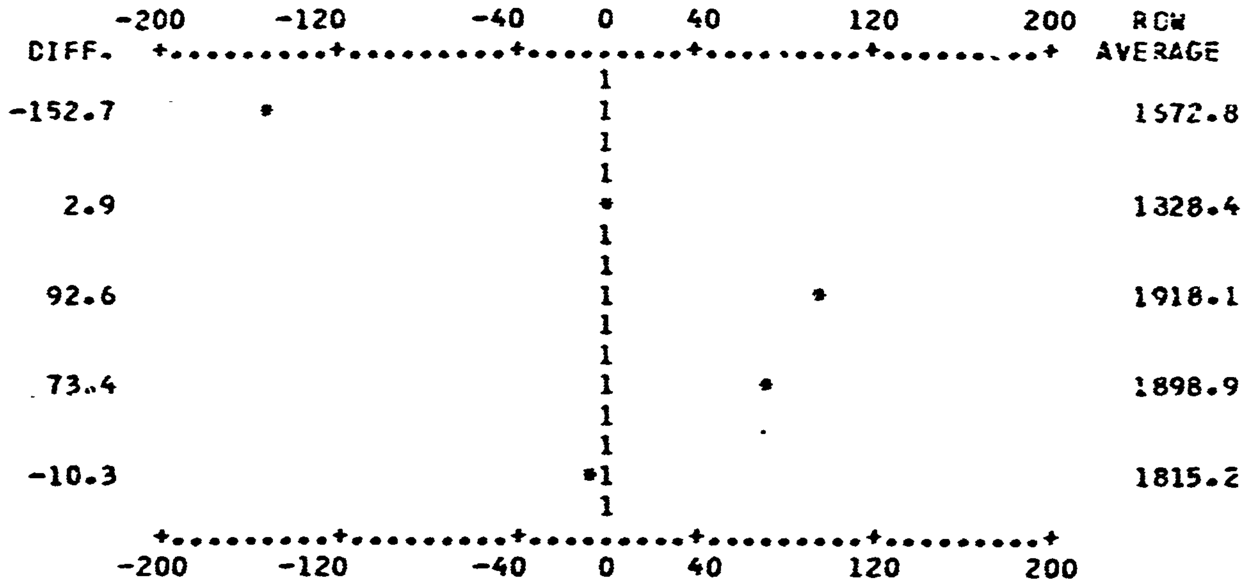
Figure 4.1-7

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

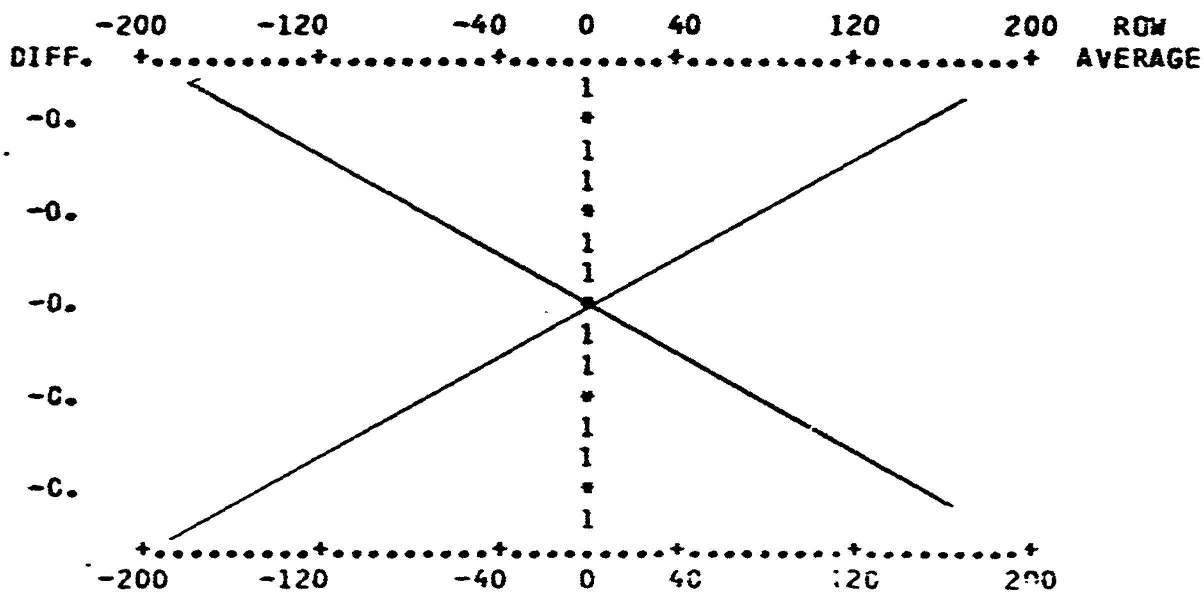
RDG 14,15,16,7246 RPM,T2-79.0,T5-1138,JP-5 FUEL,10-15-63

INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9



AVG. TT4 = 1825.5 TT3 = 709.0 DELTA T = 1116.5
MAX. TT4 = 2269.8 PATTERN FACTOR = 0.398
AVG PATTERN FACTOR =0.295 AVG INTERGRATED PATTERN FACTOR = 0.297



TT3 = 709.C

Figure 4.1-8

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q23868

RDG 18,19,20,7280 RPM,T2-78.0,T5-1160,JP-5 FUEL,10-15-63
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1571.	1800.	1877.	1878.	1845.
1	1795.	1901.		1897.	1722.
2	1818.	1937.	2099.	1994.	1732.
3	1816.	2002.	2060.	1965.	
4	1883.	1919.	1935.	1953.	1919.
5	1497.	1719.	1863.	2039.	2228.
0					
AVG.	1730.	1880.	1967.	1954.	1889.

LINER POS. 1

AVG. T4 = 1881.
AVG. T3 = 718.
PATTERN FAC.= 0.298
AVGT4-T3 = .163.
MAXT4-AVGT4 = 347.

VANE	1	2	3	4	5
11	1557.	1749.	1898.	1970.	1936.
12	1734.	1895.	1945.	1870.	1745.
13	1896.	2031.	2062.	1961.	1748.
14	1900.	2028.	2050.	1935.	1714.
15	1651.	1905.	1948.	1863.	1759.
16	1671.	1782.	1880.	1950.	1970.
0					
AVG.	1735.	1898.	1964.	1925.	1812.

LINER POS. 3

AVG. T4 = 1867.
AVG. T3 = 718.
PATTERN FAC.= 0.170
AVGT4-T3 = 1149.
MAXT4-AVGT4 = 195.

VANE	1	2	3	4	5
23	1675.	1742.	1811.	1808.	1760.
24	1625.	1788.	1915.	1901.	1709.
25	1624.	1831.	2028.	1961.	1792.
26	1796.	2011.	2025.	1895.	1699.
27	1733.	1943.	1957.	1828.	1821.
28	1473.	1658.	1806.	1895.	1995.
0					
AVG.	1654.	1829.	1924.	1881.	1796.

LINER POS. 5

AVG. T4 = 1817.
AVG. T3 = 718.
PATTERN FAC.= 0.193
AVGT4-T3 = 1099.
MAXT4-AVGT4 = 212.

VANE	1	2	3	4	5
34	1503.	1723.	1888.	2095.	2336.
35	1712.	1939.	2118.	2200.	2170.
36	1711.	1911.	2070.	2197.	2097.
37	1816.	1964.	2072.	2068.	1851.
38	1681.	1825.	1862.	1781.	1600.
39	1522.	1571.	1596.	1577.	1538.
0					
AVG.	1657.	1822.	1933.	1986.	1932.

LINER POS. 7

AVG. T4 = 1866.
AVG. T3 = 718.
PATTERN FAC.= 0.409
AVGT4-T3 = 1148.
MAXT4-AVGT4 = 470.

VANE	1	2	3	4	5
46	1725.	1935.	2049.	2157.	2243.
47	1782.	1972.	2081.	2045.	1882.
48	1781.	1913.	2093.	2006.	1777.
49	1802.	1838.	1957.	1826.	1571.
50	1599.	1749.		1782.	1713.
51	1477.	1646.	1742.	1851.	1935.
0					
AVG.	1695.	1842.	1985.	1944.	1854.

LINER POS. 9

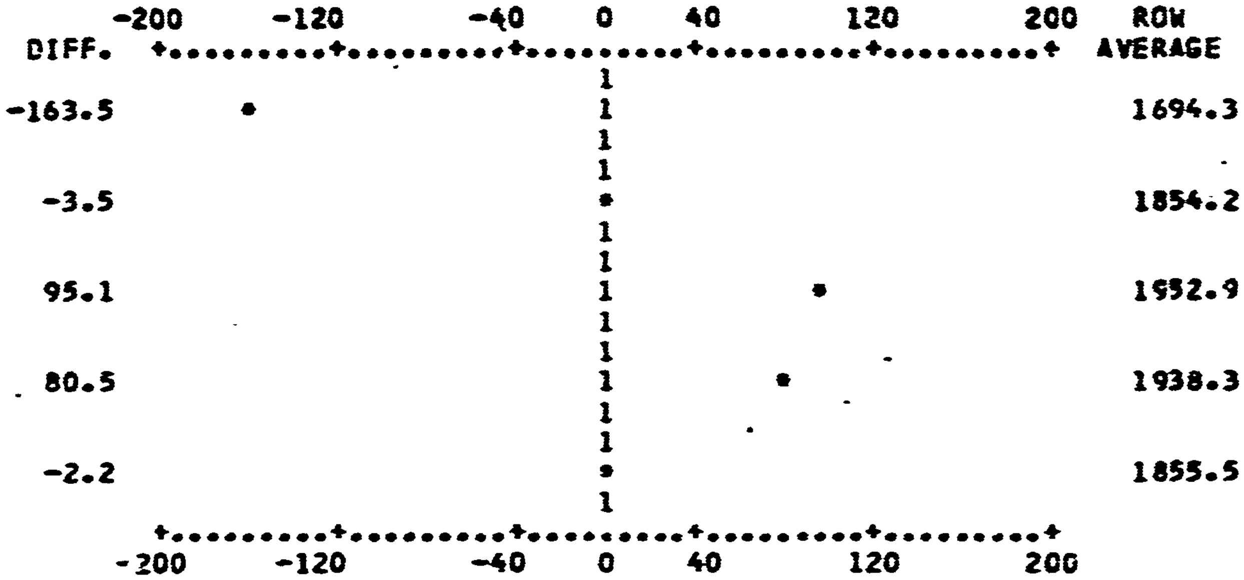
AVG. T4 = 1860.
AVG. T3 = 718.
PATTERN FAC.= 0.336
AVGT4-T3 = 1142.
MAXT4-AVGT4 = 384.

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

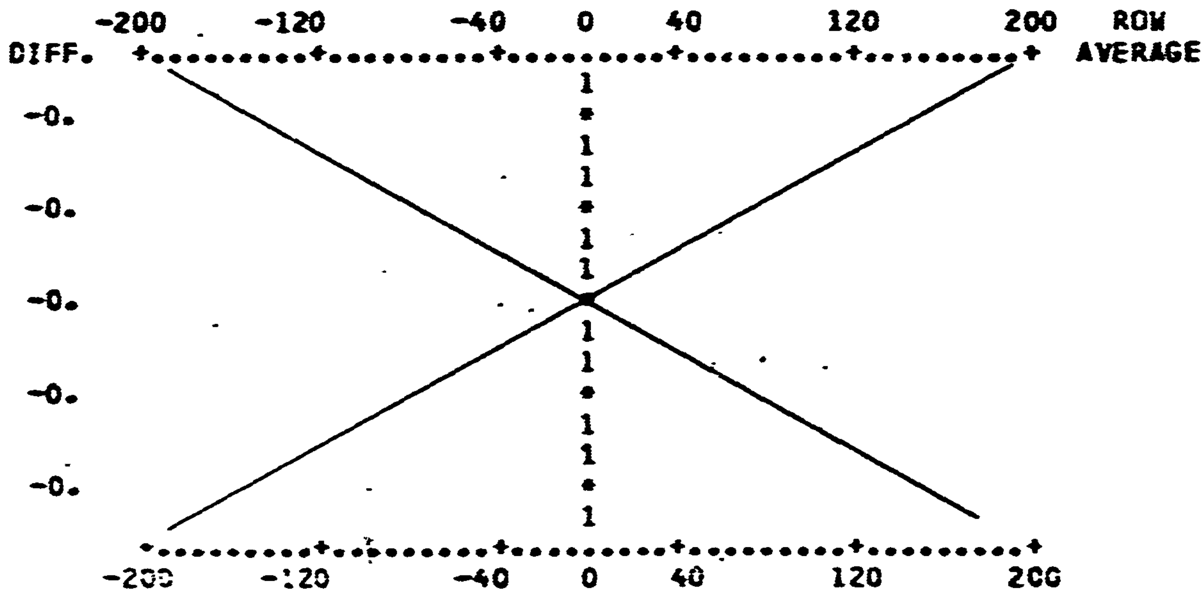
RDG 18,19,20,7280 RPM,T2-78.0,T5-1160,JP-5 FUEL,10-15-63

INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9



AVG. TT4 = 1857.8 TT3 = 718.2 DELTA T = 1139.6
MAX. TT4 = 2336.2 PATTERN FACTOR = 0.420
AVG PATTERN FACTOR = 0.281 AVG INTERGRATED PATTERN FACTOR = 0.282



AVG. TT4 = TT3 = 718.2 DELTA T =
MAX. TT4 = 0. PATTERN FACTOR = -1.000

Figure 4.1-10

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 023868

RCC 22,23,24,7330 RPM,T2-78.5,T5-1187,JP-5 FUEL,10-15-63
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1599..	1828.	1903.	1902.	1868.
1	1813.	1920.		1931.	1757.
2	1839.	1952.	2124.	2028.	1770.
3	1833.	2030.	2092.	1995.	
4	1919.	1966.	1993.	2022.	1985.
5	1479.	1693.	1832.	1974.	2117.
0					
AVG.	1747.	1898.	1989.	1975.	1899.

LINER POS. 1

AVG. T4 = 1899.
AVG. T3 = 728.
PATTERN FAC.= 0.192
AVGT4-T3 = 1171.
MAXT4-AVGT4 = 225.

VANE	1	2	3	4	5
11	1589.	1782.	1944.	2022.	1983.
12	1762.	1930.	1987.	1916.	1784.
13	1928.	2064.	2105.	2003.	1787.
14	1942.	2071.	2098.	1979.	1754.
15	1706.	1961.	2003.	1914.	1819.
16	1716.	1836.	1947.	2026.	2056.
0					
AVG.	1774.	1941.	2014.	1977.	1864.

LINER POS. 3

AVG. T4 = 1914.
AVG. T3 = 728.
PATTERN FAC.= 0.161
AVGT4-T3 = 1186.
MAXT4-AVGT4 = 191.

VANE	1	2	3	4	5
23	1726.	1800.	1874.	1863.	1802.
24	1696.	1858.	1964.	1937.	1742.
25	1688.	1897.	2090.	1980.	1837.
26	1867.	2081.	2091.	1946.	1745.
27	1773.	1998.	2022.	1694.	1885.
28	1511.	1701.	1858.	1968.	2081.
0					
AVG.	1710.	1889.	1983.	1898.	1849.

LINER POS. 5

AVG. T4 = 1866.
AVG. T3 = 728.
PATTERN FAC.= 0.198
AVGT4-T3 = 1138.
MAXT4-AVGT4 = 225.

VANE	1	2	3	4	5
34	1540.	1770.	1946.	2158.	2404.
35	1755.	1994.	2175.	2271.	2221.
36	1738.	1944.	2111.	2254.	2148.
37	1856.	1996.	2116.	2122.	1907.
38	1689.	1836.	1891.	1821.	1633.
39	1504.	1560.	1596.	1569.	1530.
0					
AVG.	1680.	1850.	1972.	2032.	1974.

LINER POS. 7

AVG. T4 = 1902.
AVG. T3 = 728.
PATTERN FAC.= 0.428
AVGT4-T3 = 1174.
MAXT4-AVGT4 = 502.

VANE	1	2	3	4	5
46	1765.	1984.	2114.	2233.	2329.
47	1807.	2008.	2128.	2097.	1931.
48	1800.	1932.	2134.	2043.	1811.
49	1815.	1851.	1989.	1862.	1608.
50	1615.	1770.		1817.	1747.
51	1494.	1664.	1756.	1866.	1956.
0					
AVG.	1716.	1868.	2024.	1986.	1897.

LINER POS. 9

AVG. T4 = 1894.
AVG. T3 = 728.
PATTERN FAC.= 0.373
AVGT4-T3 = 1166.
MAXT4-AVGT4 = 435.

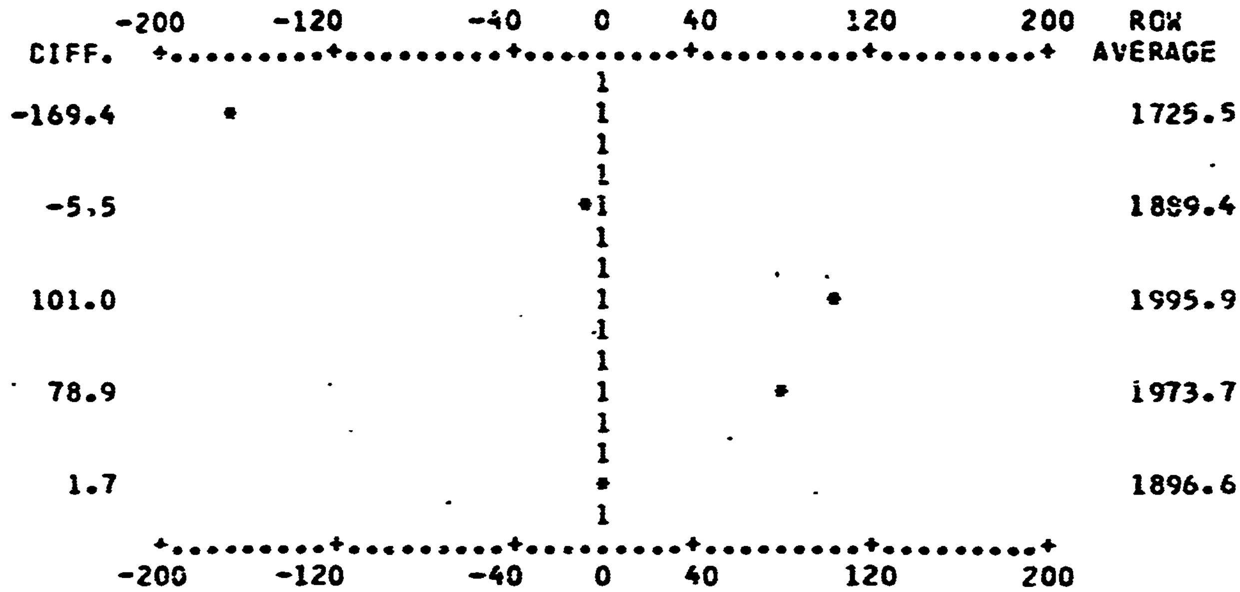
Figure .1-11

T4 PROFILE AND PATTERN EVALUATION PROGRAM - C23868

RCG 22,23,24,7330 RPM,T2-78.5,T5-1187,JP-5 FUEL,10-15-63

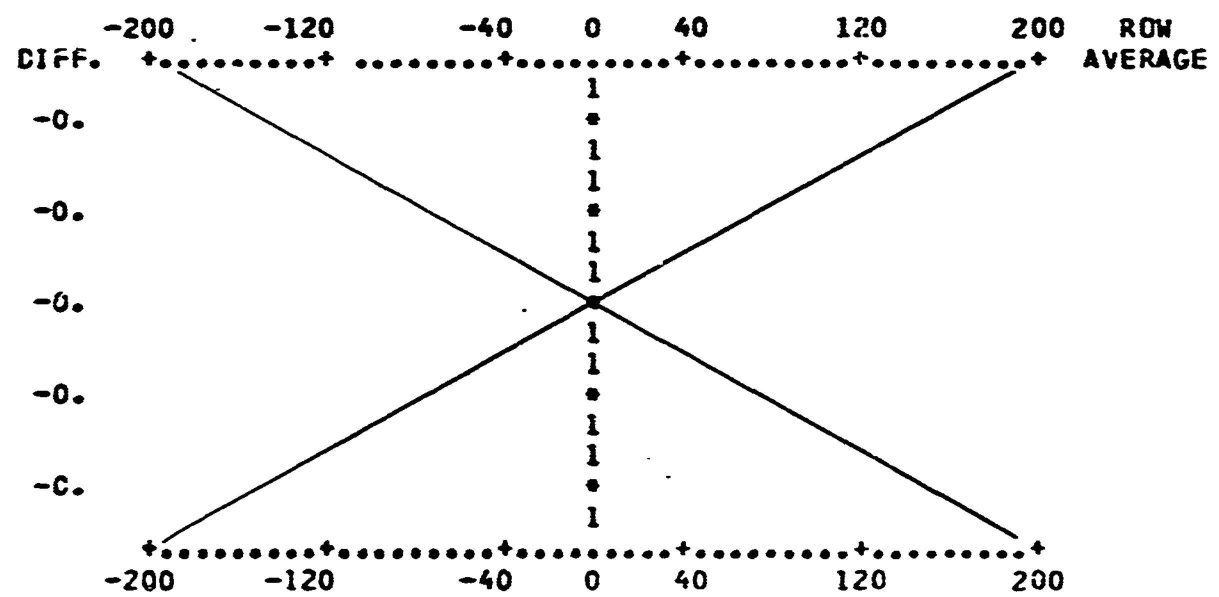
INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9



AVG. TT4 = 1894.8 TT3 = 728.1 DELTA T = 1166.7
MAX. TT4 = 2404.3 PATTERN FACTOR = 0.437
AVG PATTERN FACTOR = 0.271 AVG INTERGRATED PATTERN FACTOR = 0.271

LI... ... ...



AVG. TT4 = TT3 = 728.1 DELTA T =
MAX. TT4 = 0. PATTERN FACTOR = -[illegible]

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 02386B

RDG 26,27,28,RPM 6890,T2-.2.0,T5-920,DIESEL FUEL,10-22-63

TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5	
58	1423.	1492.	1548.	1546.	1519.	LINER POS. 1
1	1424.	1523.	1594.	1573.	1437.	
2	1406.	1507.	1682.	1638.	1441.	AVG. T4 = 1542.
3	1467.	1617.	1689.	1626.	1445.	AVG. T3 = 621.
4	1641.	1692.	1717.	1736.	1702.	PATTERN FAC.= 0.211
5	1203.	1368.	1462.	1527.	1607.	AVGT4-T3 = 921.
0						MAXT4-AVGT4 = 194.
AVG.	1427.	1533.	1615.	1608.	1525.	
11	1254.	1405.	1515.	1568.	1568.	LINER POS. 3
12	1402.	1517.	1546.	1504.	1424.	
13	1505.	1606.	1632.	1562.	1417.	AVG. T4 = 1506.
14	1509.	1623.	1663.	1582.	1408.	AVG. T3 = 621.
15	1332.	1522.	1588.	1546.	1474.	PATTERN FAC.= 0.178
16	1335.	1446.	1530.	1581.	1611.	AVGT4-T3 = 885.
0						MAXT4-AVGT4 = 157.
AVG.	1390.	1520.	1579.	1557.	1484.	
23	1434.	1529.	1635.	1650.	1624.	LINER POS. 5
24	1453.	1579.	1653.	1627.	1486.	
25	1438.	1571.	1688.		1473.	AVG. T4 = 1504.
26	1493.	1658.	1669.	1574.	1414.	AVG. T3 = 621.
27	1373.	1523.	1518.	1466.	1373.	PATTERN FAC.= 0.209
28	1167.	1276.	1364.	1427.	1477.	AVGT4-T3 = 883.
0						MAXT4-AVGT4 = 184.
AVG.	1393.	1523.	1588.	1549.	1475.	
34	1275.	1416.	1505.	1632.	1764.	LINER POS. 7
35	1311.	1507.	1624.	1664.	1646.	
36	1450.	1607.	1675.	1707.	1617.	AVG. T4 = 1536.
37	1599.	1674.	1710.	1644.	1460.	AVG. T3 = 621.
38	1495.	1597.	1588.	1490.	1348.	PATTERN FAC.= 0.249
39	1384.	1425.	1441.	1428.	1401.	AVGT4-T3 = 915.
0						MAXT4-AVGT4 = 228.
AVG.	1419.	1538.	1590.	1594.	1539.	
46	1393.	1577.	1624.	1669.	1700.	LINER POS. 9
47	1454.	1599.	1671.	1638.	1521.	
48	1452.	1574.	1710.	1637.	1459.	AVG. T4 = 1545.
49	1521.	1538.	1650.	1544.	1345.	AVG. T3 = 621.
50	1379.	1506.		1560.	1517.	PATTERN FAC.= 0.178
51	1290.	1448.	1532.	1623.	1673.	AVGT4-T3 = 924.
0						MAXT4-AVGT4 = 165.
AVG.	1415.	1541.	1638.	1612.	1536.	

Figure 4.1-13

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            T4 PROFILE AND PATTERN EVALUATION PROGRAM - 023868

      RDG 26,27,28,RPM 6890,T2-62.0,T5-920,DIESEL FUEL,10-22-63

                  INTEGRATED RADIAL PROFILE PLOTS


                       LINER POS.   1,3,5,7,9

        -200      -120       -40     0    40       120       200   ROW
 DIFF.   +.........+.........+.........+.........+.........+  AVERAGE
                                   1
-117.7              *              1                            1408.8
                                   1
                                   1
   4.2                             1*                           1530.8
                                   1
                                   1
  74.2                             1        *                   1600.8
                                   1
                                   1
  58.6                             1      *                     1585.2
                                   1
                                   1
 -14.9                           * 1                            1511.7
                                   1
         +.........+.........+.........+.........+.........+
        -200      -120       -40     0    40       120       200

     AVG. TT4 = 1526.6          TT3 =  621.0         DELTA T =   905.6
     MAX. TT4 = 1764.5            PATTERN FACTOR =    0.263
     AVG PATTERN FACTOR = 0.205    AVG INTERGRATED PATTERN FACTOR = 0.205


        -200      -120       -40     0    40       120       200   ROW
 DIFF.   +.........+.........+.........+.........+.........+  AVERAGE
                                   1
  -0.                              *
                                   1
                                   1
  -0.                              *
                                   1
                                   1
  -0.                              *
                                   1
                                   1
  -0.                              *
                                   1
                                   1
  -0.                              *
                                   1
         +.........+.........+.........+.........+.........+
        -200      -120       -40     0    40       120       200

     AVG. TT4 =                 TT3 =  621.0         DELTA T =
     MAX. TT4 =      0.           PATTERN FACTOR =  -1.000
```

Figure 4.1-14

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

RDG 30,31,32,RPM 7114,T2-65.5,T5-1050,DIESEL FUEL,10-22-63
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5		
58	1578.	1654.	1698.	1655.	1618.	LINER POS.	1
1	1745.	1813.	1832.	1733.	1547.		
2	1801.	1854.	1962.	1824.	1568.	AVG. T4 =	1737.
3	1819.	1948.	1922.	1776.	1542.	AVG. T3 =	673.
4	1750.	1781.	1788.	1798.	1767.	PATTERN FAC.=	0.211
5	1362.	1562.	1690.	1805.	1921.	AVGT4-T3 =	1065.
0						MAXT4-AVGT4 =	225.
AVG.	1676.	1769.	1815.	1765.	1661.		
11	1369.	1543.	1675.	1743.	1724.	LINER POS.	3
12	1525.	1663.	1713.	1667.	1572.		
13	1654.	1773.	1817.	1746.	1576.	AVG. T4 =	1677.
14	1700.	1815.	1851.	1749.	1555.	AVG. T3 =	673.
15	1517.	1737.	1788.	1712.	1616.	PATTERN FAC.=	0.173
16	1540.	1648.	1735.	1789.	1800.	AVGT4-T3 =	1005.
0						MAXT4-AVGT4 =	174.
AVG.	1551.	1697.	1763.	1734.	1641.		
23	1677.	1754.	1847.	1853.	1833.	LINER POS.	5
24	1629.	1783.	1867.	1827.	1646.		
25	1603.	1754.	1883.	1841.	1646.	AVG. T4 =	1679.
26	1643.	1826.	1837.	1737.	1564.	AVG. T3 =	673.
27	1515.	1664.	1658.		1519.	PATTERN FAC.=	0.203
28	1264.	1379.	1474.	1550.	1616.	AVGT4-T3 =	1006.
0						MAXT4-AVGT4 =	204.
AVG.	1555.	1694.	1761.	1761.	1637.		
34	1381.	1550.	1668.	1830.	2026.	LINER POS.	7
35	1508.	1712.	1844.	1896.	1864.		
36	1628.	1804.	1894.	1943.	1829.	AVG. T4 =	1713.
37	1780.	1885.	1924.	1865.	1662.	AVG. T3 =	673.
38	1660.	1771.	1751.	1636.	1469.	PATTERN FAC.=	0.300
39	1496.	1532.	1551.	1535.	1499.	AVGT4-T3 =	1041.
0						MAXT4-AVGT4 =	313.
AVG.	1576.	1709.	1772.	1784.	1725.		
46	1543.	1751.	1828.	1906.	1962.	LINER POS.	9
47	1647.	1808.	1887.	1844.	1710.		
48	1651.	1761.	1926.	1845.	1641.	AVG. T4 =	1719.
49	1701.	1725.	1831.	1698.	1464.	AVG. T3 =	673.
50	1519.	1659.		1688.	1627.	PATTERN FAC.=	0.232
51	1409.	1570.	1659.	1761.	1841.	AVGT4-T3 =	1047.
0						MAXT4-AVGT4 =	243.
AVG.	1578.	1712.	1826.	1791.	1708.		

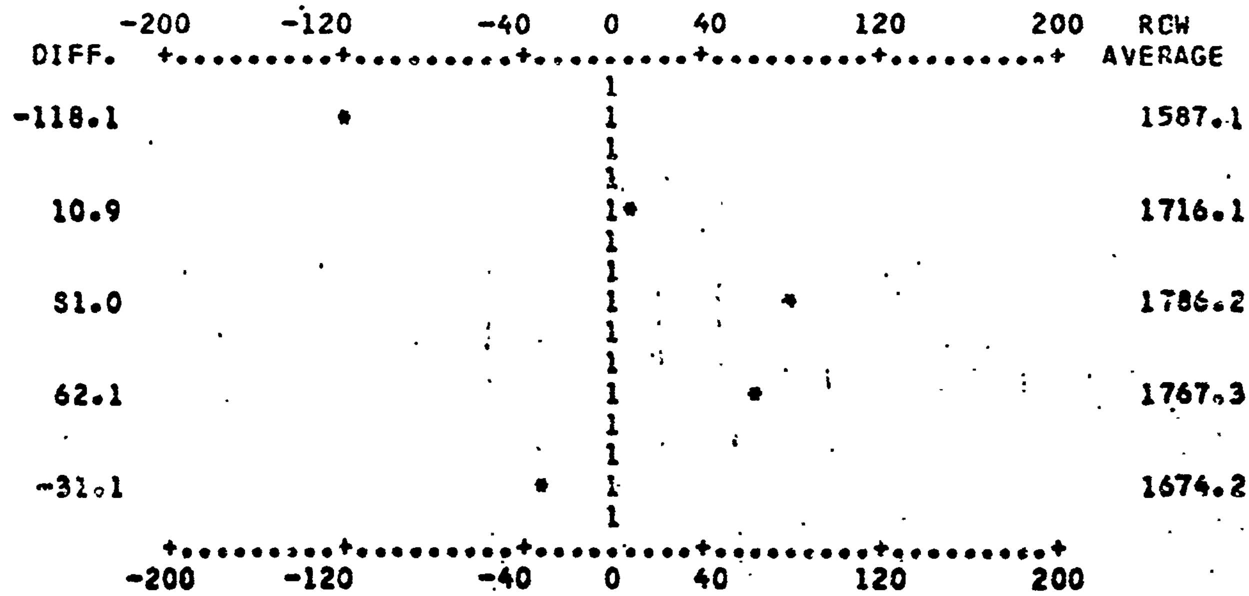
Figure 4.1-15

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q23868

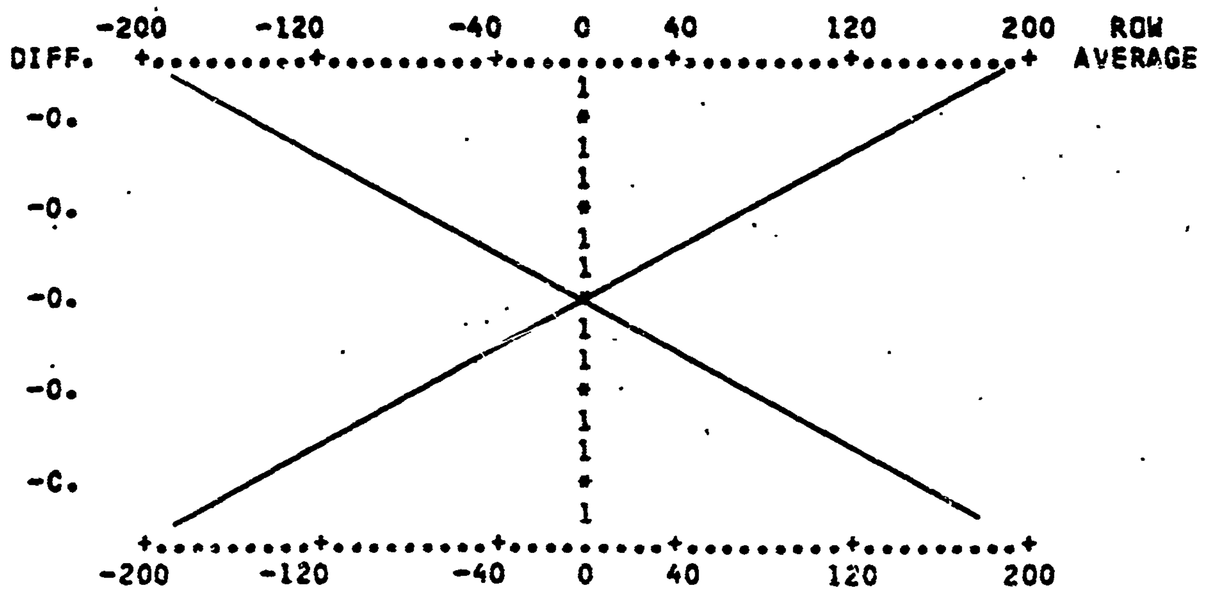
RDG 30,31,32,RPM 7114,T2-65.5,T5-1050,DIESEL FUEL,10-22-63

INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9



AVG. TT4 = 1705.2 TT3 = 672.5 DELTA T = 1032.7
MAX. TT4 = 2025.7 PATTERN FACTOR = 0.310
AVG PATTERN FACTOR = 0.224 AVG INTERGRATED PATTERN FACTOR = 0.224



AVG. TT4 = TT3 = 672.5 DELTA T =
MAX. TT4 = 0. PATTERN FACTOR = -1.000

Figure 4.3.16

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 023868

ROG 34,35,36,RPM 7195,T2-68.0,T5-1100,DIESEL FUEL,10-22-63
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5	
58	1587.	1667.	1707.	1661.	1617.	LINER POS. 1
1	1784.	1851.	1876.	1777.	1585.	
2	1840.	1908.	2053.	1921.	1644.	AVG. T4 = 1806.
3	1864.	2030.	2029.	1889.	1626.	AVG. T3 = 690.
4	1863.	1913.	1923.	1938.	1895.	PATTERN FAC.= 0.221
5	1414.	1621.	1751.	1895.	2043.	AVGT4-T3 = 1116.
0						MAXT4-AVGT4 = 247.
AVG.	1725.	1832.	1890.	1847.	1735.	
11	1417.	1597.	1732.	1806.	1783.	LINER POS. 3
12	1581.	1722.	1778.	1730.	1627.	
13	1709.	1836.	1886.	1814.	1636.	AVG. T4 = 1740.
14	1752.	1874.	1916.	1817.	1616.	AVG. T3 = 690.
15	1575.	1800.	1854.	1779.	1684.	PATTERN FAC.= 0.167
16	1605.	1714.	1810.	1874.	1883.	AVGT4-T3 = 1050.
0						MAXT4-AVGT4 = 176.
AVG.	1607.	1757.	1829.	1803.	1705.	
23	1649.	1714.	1784.	1793.	1775.	LINER POS. 5
24	1610.	1767.	1866.	1838.	1657.	
25	1590.	1770.	1938.	1909.	1710.	AVG. T4 = 1740.
26	1684.	1888.	1916.	1810.	1644.	AVG. T3 = 690.
27	1619.	1808.	1834.		1721.	PATTERN FAC.= 0.189
28	1386.	1544.	1666.	1743.	1827.	AVGT4-T3 = 1050.
0						MAXT4-AVGT4 = 198.
AVG.	1590.	1749.	1834.	1819.	1723.	
34	1448.	1643.	1786.	1981.	2217.	LINER POS. 7
35	1606.	1820.	1976.	2057.	2030.	
36	1628.	1813.	1949.	2059.	1959.	AVG. T4 = 1774.
37	1764.	1893.	1971.	1949.	1744.	AVG. T3 = 690.
38	1632.	1763.	1783.	1692.	1518.	PATTERN FAC.= 0.408
39	1481.	1521.	1540.	1519.	1482.	AVGT4-T3 = 1084.
0						MAXT4-AVGT4 = 443.
AVG.	1593.	1742.	1834.	1876.	1825.	
46	1606.	1847.	1925.	2012.	2077.	LINER POS. 9
47	1711.	1892.	1987.	1938.	1782.	
48	1699.	1820.	1997.	1921.	1709.	AVG. T4 = 1776.
49	1730.	1750.	1875.	1753.	1516.	AVG. T3 = 690.
50	1549.	1695.		1718.	1652.	PATTERN FAC.= 0.277
51	1428.	1591.	1675.	1778.	1868.	AVGT4-T3 = 1086.
0						MAXT4-AVGT4 = 301.
AVG.	1620.	1766.	1892.	1853.	1767.	

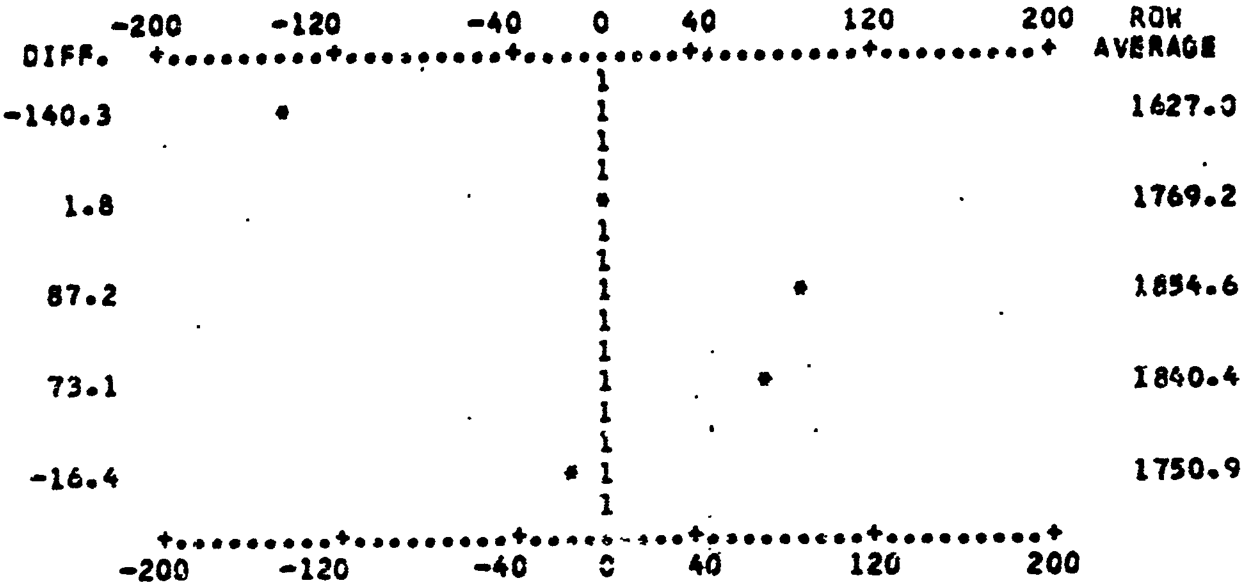
Figure 4.1-17

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

RDG 34,35,36,RPM 7195,T2-68.0,T5-1100,DIESEL FUEL:10-22-63

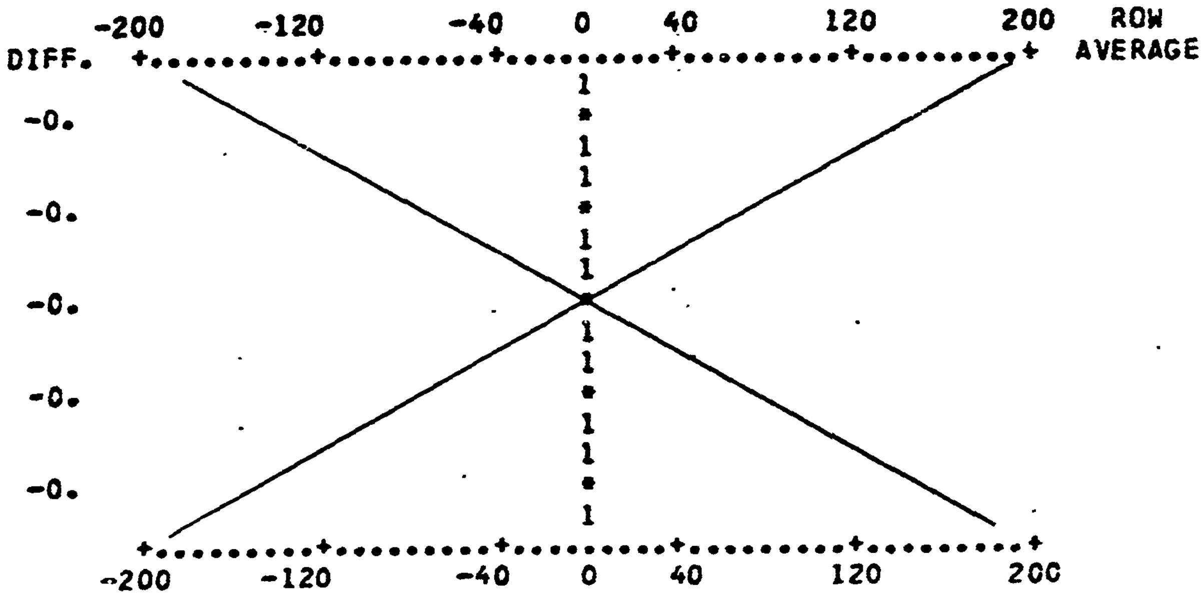
INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9



AVG. TT4 = 1767.4 TT3 = 690.0 DELTA T = 1077.4
MAX. TT4 = 2217.0 PATTERN FACTOR = 0.417
AVG PATTERN FACTOR = 0.253 AVG INTERGRATED PATTERN FACTOR = 0.253

LINER POS. [illegible]



AVG. TT4 = TT3 = 690.0 DELTA T =
MAX. TT4 = 0. PATTERN FACTOR = -1.000

T4 PROFILE AND PATTERN EVALUATION PROGRAM - C2386B

RDG 38,39,40,RPM 7280,T2-69.0,T5-1135,DIESEL FUEL,10-22-63
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5		
58	1647.	1737.	1795.	1767.	1709.	LINER POS.	1
1	1764.	1365.	1924.	1860.	1669.		
2	1799.	1894.	2100.	2002.	1731.	AVG. T4 =	1869.
3	1846.	2034.	2079.	1973.	1707.	AVG. T3 =	705.
4	1924.	1984.	2008.	2036.	1991.	PATTERN FAC.=	0.[illegible]
5	1485.	1696.	1830.	2013.	2213.	AVGT4-T3 =	1164.
0						MAXT4-AVGT4 =	343.
AVG.	1744.	1868.	1956.	1942.	1837.		
11	1497.	1678.	1825.	1898.	1856.	LINER POS.	3
12	1702.	1855.	1878.	1798.	1681.		
13	1855.	1970.	1989.	1883.	1680.	AVG. T4 =	1800.
14	1884.	1992.	1997.	1858.	1639.	AVG. T3 =	705.
15	1637.	1673.	1886.	1776.	1662.	PATTERN FAC.=	0.180
16	1620.	1703.	1778.	1825.	1824.	AVGT4-T3 =	1095.
0						MAXT4-AVGT4 =	197.
AVG.	1699.	1845.	1892.	1840.	1724.		
23	1674.	1747.	1832.	1831.	1782.	LINER POS.	5
24	1612.	1762.	1880.	1880.	1697.		
25	1624.	1821.	2015.	1997.	1779.	AVG. T4 =	1812.
26	1800.	2021.	2025.	1891.	1706.	AVG. T3 =	705.
27	1732.	1949.	1970.		1830.	PATTERN FAC.=	0.192
28	1461.	1640.	1776.	1866.	1956.	AVGT4-T3 =	1107.
0						MAXT4-AVGT4 =	213.
AVG.	1651.	1823.	1916.	1893.	1792.		
34	1497.	1704.	1859.	2062.	2303.	LINER POS.	7
35	1688.	1917.	2079.	2157.	2108.		
36	1693.	1892.	2031.	2155.	2040.	AVG. T4 =	1837.
37	1800.	1942.	2043.	2037.	1822.	AVG. T3 =	705.
38	1660.	1799.	1839.	1753.	1571.	PATTERN FAC.=	0.411
39	1494.	1541.	1567.	1545.	1506.	AVGT4-T3 =	1132.
0						MAXT4-AVGT4 =	466.
AVG.	1639.	1799.	1903.	1952.	1892.		
46	1644.	1894.	1954.	2032.	2098.	LINER POS.	9
47	1822.	2010.	2072.	1999.	1804.		
48	1830.	1942.	2100.	1985.	1737.	AVG. T4 =	1847.
49	1883.	1877.	1983.	1832.	1553.	AVG. T3 =	705.
50	1640.	1796.		1771.	1684.	PATTERN FAC.=	0.222
51	1483.	1647.	1720.	1822.	1935.	AVGT4-T3 =	1142.
0						MAXT4-AVGT4 =	254.
AVG.	1717.	1861.	1966.	1907.	1802.		

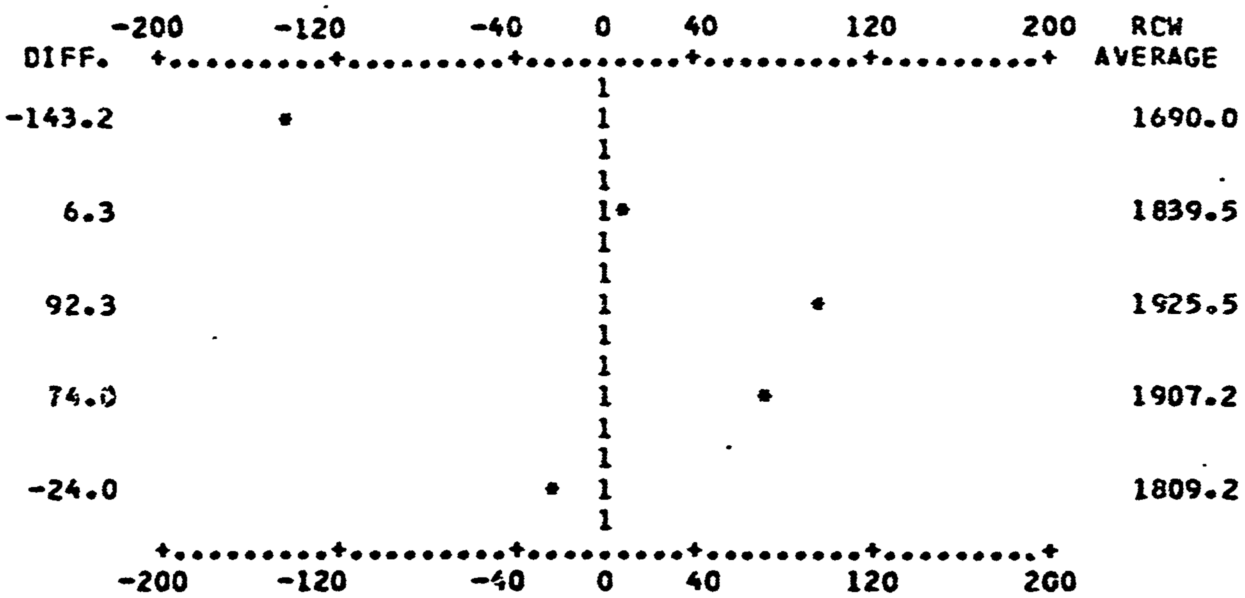
Figure 4.1-19

T4 PROFILE AND PATTERN EVALUATION PROGRAM - C2386B

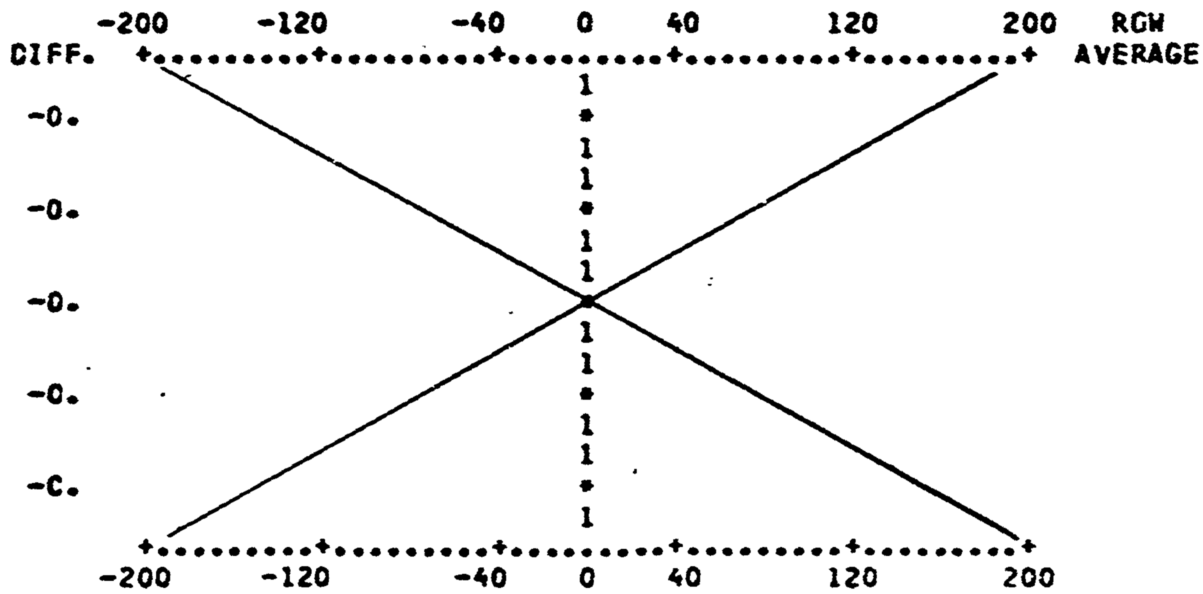
RDG 38,39,40,RPM 7280,T2-69.0,T5-1135,DIESEL FUEL,10-22-63

INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9



AVG. TT4 = 1833.2 TT3 = 705.0 DELTA T = 1128.2
MAX. TT4 = 2302.7 PATTERN FACTOR = 0.416
AVG PATTERN FACTOR = 0.260 AVG INTERGRATED PATTERN FACTOR = 0.261



AVG. TT4 = TT3 = 7? .0 DELTA T =
MAX. TT4 = C. PATTERN FACTOR = -1.?00

Fig. 4.1-20

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 023868

RDG 42,43,44,RPM 7295,T2-70.0,T5-1160,DIESEL FUEL,10-22-63
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5		
58	1686.	1792.	1856.	1835.	1772.	LINER POS.	1
1	1760.	1865.	1948.	1901.	1716.		
2	1749.	1848.	2089.	2020.	1762.	AVG. T4 =	1871.
3	1801.	1988.	2062.	1982.	1720.	AVG. T3 =	712.
4	1917.	1976.	2002.	2028.	1987.	PATTERN FAC.=	0.242
5	1472.	1681.	1808.	1972.	2153.	AVGT4-T3 =	1160.
0						MAXT4-AVGT4 =	281.
AVG.	1731.	1858.	1961.	1956.	1851.		
11	1516.	1707.	1861.	1925.	1875.	LINER POS.	3
12	1748.	1900.	1913.	1819.	1695.		
13	1897.	2008.	2027.	1917.	1700.	AVG. T4 =	1826.
14	1880.	1996.	2007.	1873.	1654.	AVG. T3 =	712.
15	1655.	1874.	1889.	1791.	1684.	PATTERN FAC.=	0.181
16	1640.	1733.	181[illegible].	1875.	1892.	AVGT4-T3 =	1114.
0						MAXT4-AVGT4 =	202.
AVG.	1723.	1870.	1919.	1867.	1750.		
23	1762.	1804.	1856.	1822.	1780.	LINER POS.	5
24	1669.	1837.	1943.	1900.	1700.		
25	1723.	1912.	2051.	1980.	1747.	AVG. T4 =	1788.
26	1833.	2000.	1957.	1817.	1641.	AVG. T3 =	712.
27	1671.	1842.	1825.		1668.	PATTERN FAC.=	0.245
28	1397.	1528.	1630.	1725.	1820.	AVGT4-T3 =	1076.
0						MAXT4-AVGT4 =	263.
AVG.	1676.	1821.	1877.	1849.	1726.		
34	1509.	1711.	1859.	2064.	2286.	LINER POS.	7
35	1712.	1945.	2114.	2182.	2115.		
36	1725.	1914.	2050.	2182.	2069.	AVG. T4 =	1849.
37	1802.	1957.	2055.	2057.	1855.	AVG. T3 =	712.
38	1678.	1813.	1844.	1759.	[illegible]	PATTERN FAC.=	0.384
39	1502.	1548.	1567.	1537.	1495.	AVGT4-T3 =	1138.
0						MAXT4-AVGT4 =	437.
AVG.	1655.	1815.	1915.	1964.	1899.		
46	1676.	1907.	1974.	2047.	2087.	LINER POS.	9
47	1836.	2023.	2090.	2003.	1822.		
48	1831.	1939.	2108.	1993.	1749.	AVG. T4 =	1857.
49	1868.	1873.	1984.	1830.	1565.	AVG. T3 =	712.
50	1651.	1800.		1782.	1701.	PATTERN FAC.=	0.219
51	1496.	1664.	1743.	1853.	1970.	AVGT4-T3 =	1146.
0						MAXT4-AVGT4 =	251.
AVG.	1727.	1868.	1980.	1918.	1816.		

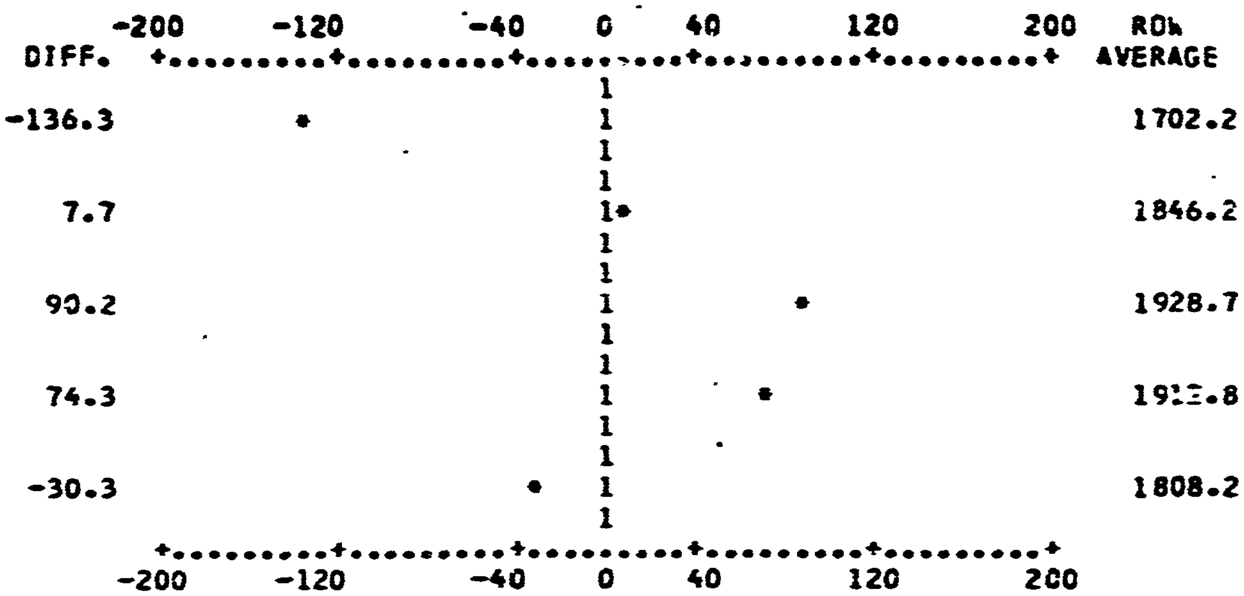
Figure 4.1-21

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

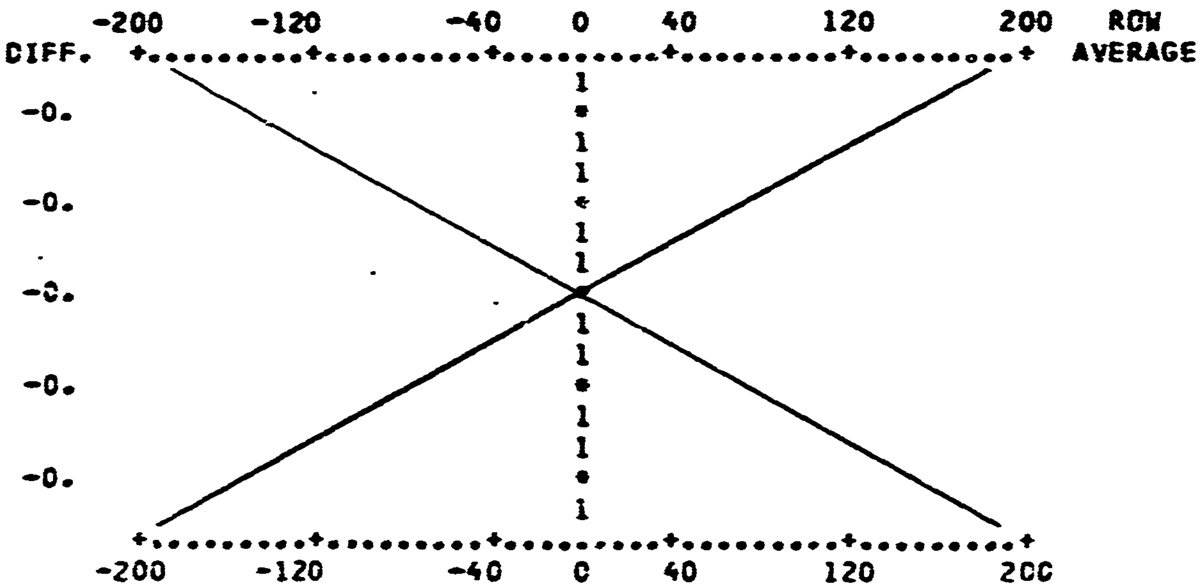
RDG 42,43,44,RPM 7295,T2-70.0,T5-1160,DIESEL FUEL,10-22-63

INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9



AVG. TT4 = 1838.5 TT3 = 711.7 DELTA T = 1126.8
MAX. TT4 = 2286.0 PATTERN FACTOR = 0.397
AVG PATTERN FACTOR = 0.254 AVG INTEGRATED PATTERN FACTOR = 0.254



TT3 =

C.

Fig. 4.1-22

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

RDG 45,46,47,RPM 7340,T2-73.0,T5-1185,DIESEL FUEL,10-22-63
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1716.	1818.	1884.	1864.	1796.
1	1766.	1887.	1972.	1934.	1749.
2	1759.	1865.	2121.	2064.	1799.
3	1806.	2010.	2092.	2020.	1759.
4	1941.	2005.	2039.	2074.	2032.
5	1501.	1710.	1836.	2014.	2216.
0					
AVG.	1748.	1882.	1991.	1995.	1892.

LINER POS. 1

AVG. T4 = 1902.
AVG. T3 = 724.
PATTERN FAC.= 0.267
AVGT4-T3 = 1178.
MAXT4-AVGT4 = 315.

VANE	1	2	3	4	5
11	1542.	1739.	1913.	1991.	1946.
12	1757.	1919.	1968.	1898.	1773.
13	1875.	2002.	2055.	1975.	1771.
14	1857.	1993.	2035.	1921.	1709.
15	1672.	1889.	1925.	1841.	1747.
16	1672.	1769.	1864.	1928.	1937.
0					
AVG.	1729.	1885.	1960.	1926.	1814.

LINER POS. 3

AVG. T4 = 1863.
AVG. T3 = 724.
PATTERN FAC.= 0.168
AVGT4-T3 = 1139.
MAXT4-AVGT4 = 192.

VANE	1	2	3	4	5
23	1852.	1913.	1960.	1924.	1865.
24	1729.	1910.	2008.	1979.	1784.
25	1713.	1893.	2079.	2063.	1838.
26	1787.	1998.	2021.	1923.	1751.
27	1704.	1888.	1904.		1807.
28	1455.	1602.	1721.	1827.	1944.
0					
AVG.	1707.	1867.	1949.	1943.	1831.

LINER POS. 5

AVG. T4 = 1857.
AVG. T3 = 724.
PATTERN FAC.= 0.196
AVGT4-T3 = 1133.
MAXT4-AVGT4 = 222.

VANE	1	2	3	4	5
34	1495.	1691.	1834.	2028.	2257.
35	1719.	1956.	2116.	2168.	2112.
36	1751.	1939.	2060.	2189.	2077.
37	1857.	1993.	2080.	2086.	1890.
38	1746.	1885.	1901.	1788.	1598.
39	1584.	1635.	1650.	1618.	1569.
0					
AVG.	1692.	1850.	1940.	1979.	1917.

LINER POS. 7

AVG. T4 = 1876.
AVG. T3 = 724.
PATTERN FAC.= 0.331
AVGT4-T3 = 1152.
MAXT4-AVGT4 = 381.

VANE	1	2	3	4	5
46	1798.	2016.	2109.	2195.	2247.
47	1858.	2062.	2160.	2097.	1909.
48	1807.	1939.	2137.	2047.	1809.
49	1804.	1817.	1976.	1847.	1589.
50	1617.	1771.		1795.	1726.
51	1503.	1673.	1755.	1871.	2013.
0					
AVG.	1731.	1880.	2027.	1976.	1882.

LINER POS. 9

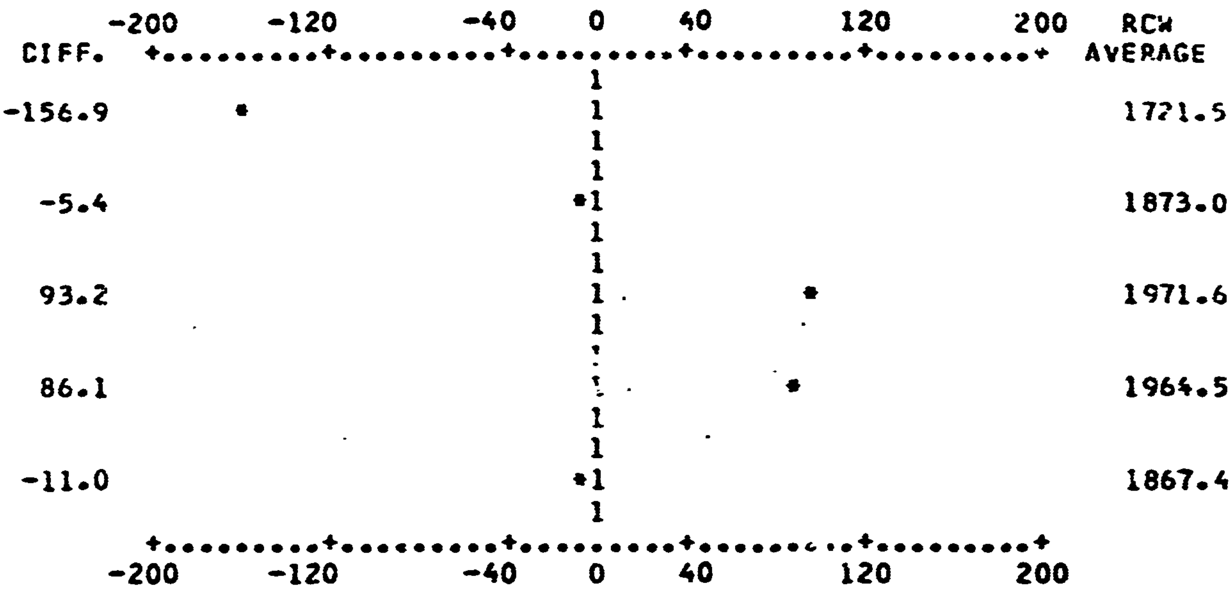
AVG. T4 = 1895.
AVG. T3 = 724.
PATTERN FAC.= 0.301
AVGT4-T3 = 1171.
MAXT4-AVGT4 = 353.

T~ PROFILE AND PATTERN EVALUATION PROGRAM - C2386B

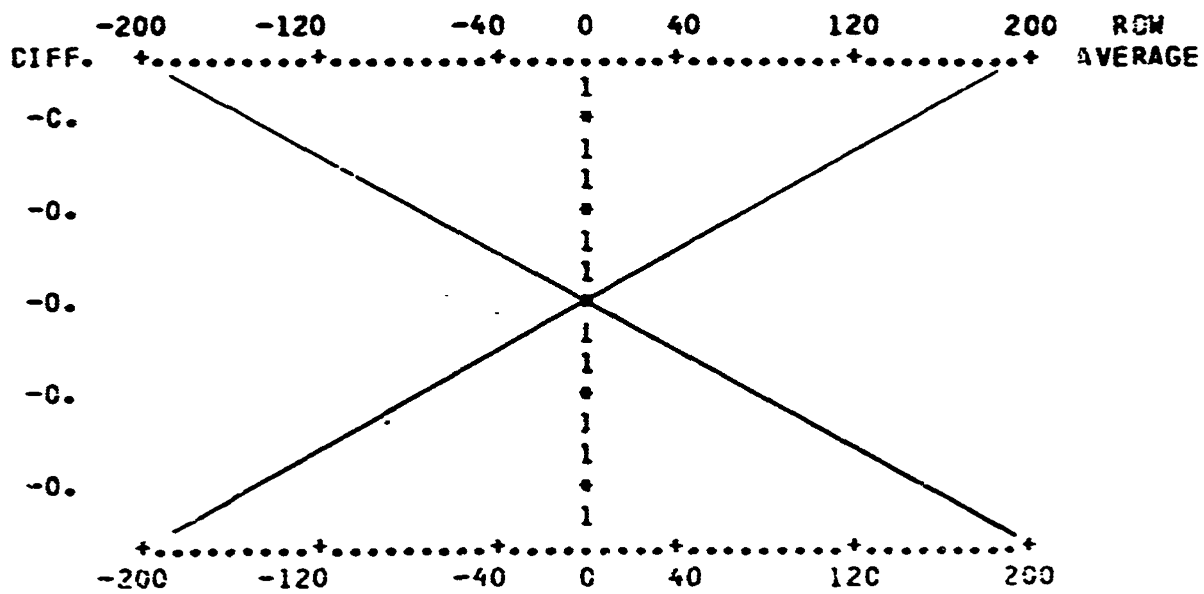
RCG 45,46,47,RPM 7340,T2-73.0,T5-1185,DIESEL FUEL,10-22-63

INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9



AVG. TT4 = 1878.4 TT3 = 724.0 DELTA T = 1154.4
MAX. TT4 = 2257.2 PATTERN FACTOR = 0.328
AVG PATTERN FACTOR = 0.253 AVG INTEGRATED PATTERN FACTOR = 0.253



AVG. TT4 = TT3 = [illegible] DELTA T =
[illegible] PATT[illegible] = [illegible]

Figure 4.1-24

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 023868

RDG 49,50,51,RPM 7415,T2-74.0,T5-1212,~~DIESEL FUEL~~,10-22-63

TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1751.	1870.	1950.	1948.	1871.
1	1778.	1912.	2015.	1995.	1810.
2	1743.	1871.	2153.	2122.	1864.
3	1785.	1989.	2109.	2072.	1820.
4	1945.	2021.	2066.	2118.	2079.
5	1523.	1725.	1843.	2029.	2231.
0					
AVG.	1754.	1898.	2023.	2047.	1946.

LINER POS. 1

AVG. T4 = 1934.
AVG. T3 = 740.
PATTERN FAC.= 0.249
AVGT4-T3 = 1194.
MAXT4-AVGT4 = 298.

VANE	1	2	3	4	5
11	1537.	1723.	1878.	1948.	1884.
12	1742.	1910.	1963.	1899.	1786.
13	1886.	2030.	2096.	2025.	1819.
14	1880.	2021.	2067.	1964.	1760.
15	1719.	1950.	1989.	1909.	1840.
16	1752.	1858.	1968.	2050.	2095.
0					
AVG.	1753.	1915.	1994.	1966.	1864.

LINER POS. 3

AVG. T4 = 1898.
AVG. T3 = 740.
PATTERN FAC.= 0.171
AVGT4-T3 = 1159.
MAXT4-AVGT4 = 198.

VANE	1	2	3	4	5
23	1829.	1879.	1920.	1876.	1809.
24	1710.	1835.	1999.	1986.	1797.
25	1727.	1933.	2129.	2121.	1870.
26	1868.	2087.	2089.	1957.	1772.
27	1750.	1926.	1926.		1800.
28	1444.	1574.	1673.	1780.	1900.
0					
AVG.	1721.	1881.	1956.	1944.	1825.

LINER POS. 5

AVG. T4 = 1863.
AVG. T3 = 740.
PATTERN FAC.= 0.238
AVGT4-T3 = 1123.
MAXT4-AVGT4 = 267.

VANE	1	2	3	4	5
34	1535.	1741.	1878.	2044.	2243.
35	1760.	2001.	2167.	2216.	2152.
36	1795.	1987.	2102.	2234.	2113.
37	1876.	2026.	2118.	2148.	1955.
38	1758.	1898.	1932.	1830.	1645.
39	1596.	1646.	1665.	1633.	1585.
0					
AVG.	1720.	1884.	1977.	2018.	1949.

LINER POS. 7

AVG. T4 = 1909.
AVG. T3 = 740.
PATTERN FAC.= 0.285
AVGT4-T3 = 1170.
MAXT4-AVGT4 = 334.

VANE	1	2	3	4	5
46	1829.	2084.	2155.	2231.	2277.
47	1936.	2142.	2224.	2139.	1938.
48	1873.	2008.	2201.	2097.	1844.
49	1851.	1860.	2030.	1913.	1622.
50	1659.	1814.		1831.	1758.
51	1533.	1704.	1785.	1919.	2099.
0					
AVG.	1780.	1935.	2079.	2022.	1923.

LINER POS. 9

AVG. T4 = 1943.
AVG. T3 = 740.
PATTERN FAC.= 0.277
AVGT4-T3 = 1204.
MAXT4-AVGT4 = 333.

Fig.4.1-25

```
T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

RDG 49,50,51,RPM 7415,T2-74.0,T5-1212,DIESEL FUEL,10-22-63

INTEGRATED RADIAL PROFILE PLOTS

                    LINER POS.   1,3,5,7,9

       -200      -120       -40    0    40       120       200  ROW
DIFF.   +.........+.........+.........+.........+.........+  AVERAGE
                                      1
-164.0     *                          1                         1745.6
                                      1
                                      1
  -7.0                               *1                         1902.6
                                      1
                                      1
  93.6                                1           *             2003.2
                                      1
                                      1
  91.7                                1          *              2001.2
                                      1
                                      1
  -8.2                               *1                         1901.3
                                      1
        +.........+.........+.........+.........+.........+
       -200      -120       -40    0    40       120       200

   AVG. TT4 = 1909.5          TT3 =  739.7         DELTA T = 1169.8
   MAX. TT4 = 2276.7           PATTERN FACTOR =    0.314
  AVG PATTERN FACTOR = 0.244    AVG INTEGRATED PATTERN FACTOR = 0.244


       -200      -120       -40    0    40       120       200  ROW
DIFF.   +.........+.........+.........+.........+.........+  AVERAGE
                                      1
   -0.                                *
                                      1
                                      1
   -0.                                *
                                      1
                                      1
   -0.                                *
                                      1
                                      1
   -0.                                *
                                      1
                                      1
   -0.                                *
                                      1
        +.........+.........+.........+.........+.........+
       -200      -120       -40    0    40       120       200

   AVG. TT4 =                 TT3 =  7[illegible].7        DELTA T =
   [illegible]
```

Fig. 4.1-26

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 023968

RCG 82,83,84,RPM 7270,T2-68.0,T5-1160,DF-2ND 10 HR,10=23
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1856.	1912.	1897.	1805.	1719.
1	1907.	2019.	1985.	1842.	1621.
2	1934.	1832.	2074.	1900.	1618.
3	1975.	1989.	1937.	1836.	1572.
4	1919.	1892.	1860.	1810.	1740.
5	1469.	1664.	1737.	1849.	1960.
0					
AVG.	1843.	1885.	1915.	1840.	1705.

LINER POS. 1

AVG. T4 = 1838.
AVG. T3 = 711.
PATTERN FAC.= 0.210
AVGT4-T3 = 1127.
MAXT4-AVGT4 = 237.

VANE	1	2	3	4	5
11	1436.	1617.	1756.	1822.	1764.
12	1752.	1896.	1862.	1753.	1626.
13	1944.	2007.	1974.	1841.	1626.
14	1942.	2042.	1982.	1810.	1591.
15	1718.	1934.	1886.	1747.	1639.
16	1654.	1742.	1806.	1869.	1915.
AVG.	1741.	1873.	1878.	1807.	1693.

LINER POS. 3

AVG. T4 = 1798.
AVG. T3 = 711.
PATTERN FAC.= 0.224
AVGT4-T3 = 1087.
MAXT4-AVGT4 = 244.

VANE	1	2	3	4	5
23	1833.	1859.	1892.	1802.	1751.
24	1942.	2069.	2081.	1937.	1701.
25	1884.	2080.	2116.	1972.	1732.
26	1991.	2082.	1973.	1817.	1626.
27	1633.	1743.	1700.		1556.
28	1328.	1409.	1466.	1542.	1622.
0					
AVG.	1768.	1874.	1871.	1814.	1665.

LINER POS. 5

AVG. T4 = 1798.
AVG. T3 = 711.
PATTERN FAC.= 0.292
AVGT4-T3 = 1087.
MAXT4-AVGT4 = 318.

VANE	1	2	3	4	5
34	1475.	1641.	1756.	1905.	2008.
35	1700.	1910.	2007.	1898.	1889.
36	1305.	1970.	2017.	2058.	1880.
37	1919.	1981.	1994.	1975.	1795.
38	1868.	1929.	1817.	1654.	1493.
39	1598.	1601.	1596.	1569.	1528.
0					
AVG.	1727.	1839.	1865.	1843.	1766.

LINER POS. 7

AVG. T4 = 1808.
AVG. T3 = 711.
PATTERN FAC.= 0.228
AVGT4-T3 = 1097.
MAXT4-AVGT4 = 250.

VANE	1	2	3	4	5
46	1660.	1958.	2009.	2065.	2072.
47	1853.	2027.		1974.	1821.
48	1797.	1842.	2035.	1943.	1711.
49	1847.	1791.	1955.	1799.	1542.
50	1687.	1820.		1772.	1682.
51	1472.	1634.	1669.	1759.	1818.
0					
AVG.	1720.	1845.	1917.	1885.	1774.

LINER POS. 9

AVG. T4 = 1822.
AVG. T3 = 711.
PATTERN FAC.= 0.226
AVGT4-T3 = 1111.
MAXT4-AVGT4 = 251.

Fig. 4.1-27

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q23868

RDG 82,83,84,RPM 7270,T2-68.0,T5-1160,DF-2ND 10 HR,10-23

INTEGRATED RADIAL PROFILE PLOTS

LINER POS.   1,3,5,7,9

```
        -200      -120        -40    0    40        120        200   ROW
DIFF.    +.........+.........+.........+.........+.........+   AVERAGE
                                      1
-52.8                       *         1                              1760.0
                                      1
                                      1
 50.3                                 1    *                         1863.1
                                      1
                                      1
 74.4                                 1       *                      1887.1
                                      1
                                      1
 26.0                                 1 *                            1838.8
                                      1
                                      1
-92.1                   *             1                              1720.6
                                      1
         +.........+.........+.........+.........+.........+
        -200      -120        -40    0    40        120        200
```

AVG. TT4 = 1812.8   TT3 = 711.0   DELTA T = 1101.8
MAX. TT4 = 2115.7   PATTERN FACTOR =   0.275
AVG PATTERN FAC"OR = 0.236   AVG INTEGRATED PATTERN FACTOR = 0.236

```
        -200      -120        -40    0    40        120        200   ROW
DIFF.    +.........+.........+.........+.........+.........+   AVERAGE
                                      1
 -0.                                  *
                                      1
                                      1
 -0.                                  *
                                      1
                                      1
 -0.                                  *
                                      1
                                      1
 -0.                                  *
                                      1
                                      1
 -0.                                  *
                                      1
         +.........+.........+.........+.........+.........+
        -200      -1??        -40    0    40        120        2CC
```

AVG. TT4 =   TT3 = 711.
MAX. TT4 =   0.

Fig. 4.1-28

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 023868

RDG 86,87,88,RPM 7270,T2-70.0,T5-1165,DF-2ND 10 HR,10-23
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1836.	1891.	1868.	1767.	1687.
1	1904.	1984.	1969.	1824.	1603.
2	2012.	1881.	2098.	1907.	1615.
3	2075.	2064.	1982.	1851.	1574.
4	1931.	1910.	1876.	1822.	1754.
5	1486.	1638.	1763.	1884.	1974.
0					
AVG.	1874.	1903.	1926.	1842.	1701.

LINER POS. 1

AVG. T4 = 1849.
AVG. T3 = 712.
PATTERN FAC.= 0.218
AVGT4-T3 = 1137.
MAXT4-AVGT4 = 248.

VANE	1	2	3	4	5
11	1443.	1624.	1756.	1822.	1744.
12	1752.	1889.	1851.	1740.	1612.
13	1987.	2036.	1983.	1829.	1598.
14	2005.	2102.	2005.	1816.	1583.
15	1773.	1984.	1906.	1749.	1633.
16	1679.	1760.	1809.	1851.	1864.
0					
AVG.	1773.	1899.	1885.	1801.	1673.

LINER POS. 3

AVG. T4 = 1806.
AVG. T3 = 712.
PATTERN FAC.= 0.270
AVGT4-T3 = 1094.
MAXT4-AVGT4 = 295.

VANE	1	2	3	4	5
23	1941.	1994.	2041.	1935.	1890.
24	2047.	2141.	2147.	1981.	1735.
25	1835.	2023.	2073.	1957.	1725.
26	1775.	1995.	1902.	1807.	1640.
27	1521.	1630.	1616.		1537.
28	1288.	1366.	1435.	1518.	1604.
0					
AVG.	1735.	1858.	1869.	1840.	1689.

LINER POS. 5

AVG. T4 = 1797.
AVG. T3 = 712.
PATTERN FAC.= 0.323
AVGT4-T3 = 1085.
MAXT4-AVGT4 = 350.

VANE	1	2	3	4	5
34	1478.	1643.	1756.	1905.	1988.
35	1677.	1893.	1996.	1876.	1882.
36	1784.	1953.	2003.	2046.	1876.
37	1900.	1951.	1965.	1962.	1788.
38	1868.	1930.	1815.	1652.	1491.
39	1652.	1654.	1647.	1616.	1555.
0					
AVG.	1727.	1837.	1864.	1843.	1763.

LINER POS. 7

AVG. T4 = 1807.
AVG. T3 = 712.
PATTERN FAC.= 0.218
AVGT4-T3 = 1095.
MAXT4-AVGT4 = 239.

VANE	1	2	3	4	5
46	1680.	1988.	2013.	2074.	2060.
47	1919.	2082.		1979.	1810.
48	1819.	1868.	2057.	1966.	1723.
49	1837.	1801.	1965.	1806.	1546.
50	1677.	1818.		1775.	1687.
51	1487.	1646.	1686.	1785.	1862.
0					
AVG.	1737.	1867.	1930.	1898.	1781.

LINER POS. 9

AVG. T4 = 1836.
AVG. T3 = 712.
PATTERN FAC.= 0.219
AVGT4-T3 = 1124.
MAXT4-AVGT4 = 246.

Fig. 4.1-29

```
          T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

       RCG 86,87,88,RPM 7270,T2-70.0,T5-1165,DF-2ND 10 HR,10-23

                  INTEGRATED RACIAL PROFILE PLOTS

                     LINER POS.   1,3,5,7,9

        -200     -120        -40    0    40        120       200   ROW
DIFF.   +.........+.........+.........+.........+.........+  AVERAGE
                                 1
-50.0                     *      1                               1769.0
                                 1
                                 1
 54.0                            1       *                       1873.0
                                 1
                                 1
 73.3                            1         *                     1892.3
                                 1
                                 1
 25.9                            1   *                           1844.8
                                 1
                                 1
-97.5                  *         1                               1721.5
                                 1
        +.........+.........+.........+.........+.........+
        -200     -120        -40    0    40        120       200

   AVG. TT4 = 1819.0        TT3 =   712.0      DELTA T = 1107.0
   MAX. TT4 = 2146.7          PATTERN FACTOR =    0.296
   AVG PATTERN FACTOR =0.250    AVG INTEGRATED PATTERN FACTOR = 0.249

        -200     -120        -40    0    40        120       200   ROW
CIFF.   +.........+.........+.........+.........+.........+  AVERAGE
                                 1
 -0.                             *
                                 1
                                 1
 -0.                             *
                                 1
                                 1
 -0.                             *
                                 1
                                 1
 -C.                             *
                                 1
                                 1
 -C.                             *
                                 1
        +.........+.........+.........+.........+.........+
        -200     -120        -40    0    40        120       200

   AVG. TT4 =               TT3 =   712.C
   MAX. TT4 =      C.         PATTERN F
```

Fig. 4.1-30

T4 PRCFILE AND PATTERN EVALUATION PROGRAM - Q2386B

RDG 89,90,91,RPM 7072,T2-73.5,T5-1050,DF-2ND 10 HR,10-23
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5	
58	1644.	1701.	1701.	1640.	1592.	LINER POS. 1
1	1751.	1815.	1806.	1666.	1473.	
2	1786.	1694.	1894.	1722.	1482.	AVG. T4 = 1695.
3	1822.	1818.	1777.	1702.	1469.	AVG. T3 = 675.
4	1753.	1751.	1736.	1700.	1647.	PATTERN FAC.= 0.195
5	1399.	1596.	1676.	1785.	1854.	AVGT4-T3 = 1020.
0						MAXT4-AVGT4 = 199.
AVG.	1693.	1729.	1765.	1703.	1586.	
11	1321.	1502.	1616.	1675.	1611.	LINER POS. 3
12	1598.	1722.	1699.	1620.	1517.	
13	1768.	1816.	1796.	1681.	1500.	AVG. T4 = 1645.
14	1748.	1847.	1797.	1661.	1474.	AVG. T3 = 675.
15	1565.	1754.	1735.	1625.	1528.	PATTERN FAC.= 0.208
16	1499.	1587.	1657.	1708.	1733.	AVGT4-T3 = 970.
0						MAXT4-AVGT4 = 202.
AVG.	1583.	1705.	1717.	1662.	1561.	
23	1707.	1765.	1842.	1757.	1723.	LINER POS. 5
24	1842.	1905.	1920.	1795.	1591.	
25	1717.	1841.	1882.	1778.	1576.	AVG. T4 = 1647.
26	1620.	1882.	1752.	1656.	1502.	AVG. T3 = 675.
27	1435.	1533.	1507.		1408.	PATTERN FAC.= 0.281
28	1217.	1294.	1366.	1442.	1502.	AVGT4-T3 = 972.
0						MAXT4-AVGT4 = 273.
AVG.	1590.	1704.	1712.	1 36.	1551.	
34	1403.	1558.	1659.	1818.	1885.	LINER POS. 7
35	1573.	1776.	1868.	1739.	1749.	
36	1693.	1846.	1865.	1879.	1712.	AVG. T4 = 1671.
37	1751.	1790.	1797.	1775.	1585.	AVG. T3 = 675.
38	1703.	1757.	1663.	1527.	1384.	PATTERN FAC.= 0.216
39	1496.	1504.	1492.	1462.	1410.	AVGT4-T3 = 996.
0						MAXT4-AVGT4 = 215.
AVG.	1603.	1705.	1724.	1700.	1621.	
46	1656.	1879.	1918.	1992.	1984.	LINER POS. 9
47	1708.	1864.		1875.	1753.	
48	1597.	1681.	1861.	1803.	1611.	AVG. T4 = 1690.
49	1612.	1620.	1766.	1649.	1438.	AVG. T3 = 675.
50	1517.	1627.		1614.	1551.	PATTERN FAC.= 0.298
51	1356.	1495.	1545.	1638.	1701.	AVGT4-T3 = 1015.
0						MAXT4-AVGT4 = 303.
AVG.	1574.	1694.	1773.	1762.	1673.	

Fig. 4.1-31

T4 PROFILE AND PATTERN EVALUATION PROGRAM - C23868

RDG 89,90,91,RPM 7072,T2-73.5,T5-1050,DF-2ND 10 HR,10-23

INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9

```
        -200      -120        -40     0    40       120       200    ROW
DIFF.   +.........+.........+.........+.........+.........+   AVERAGE
                                      1
-60.8                       *         1                            1608.7
                                      1
                                      1
 38.0                                 1    *                       1707.4
                                      1
                                      1
 66.0                                 1       *                    1735.5
                                      1
                                      1
 33.5                                 1   *                        1703.0
                                      1
                                      1
-71.2                      *          1                            1598.3
                                      1
        +.........+.........+.........+.........+.........+
        -200      -120        -40     0    40       120       200
```

AVG. TT4 = 1669.5 TT3 = 675.0 DELTA T = 994.5
MAX. TT4 = 1992.5 PATTERN FACTOR = 0.325
AVG PATTERN FACTOR = 0.239 AVG INTEGRATED PATTERN FACTOR = 0.240

```
        -200      -120        -40     0    40       120       200    ROW
DIFF.   +.........+.........+.........+.........+.........+   AVERAGE
                                      1
 -0.                                  *
                                      1
                                      1
 -0.                                  *
                                      1
                                      1
 -0.                                  *
                                      1
                                      1
 -0.                                  *
                                      1
                                      1
 -0.                                  *
                                      1
        +.........+.........+.........+.........+.........+
        -200      -120        -40     0    40       120       200
```

TT = [illegible]

Fig. 4.1-32

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 02386S

RDG 103,104,105,RPM 7070,T2=79.5,T5=1051,DF-2ND 10 HR,10-23
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5		
58	1592.	1657.	1669.	1614.	1569.	LINER POS.	1
1		1768.	1766.	1635.	1455.		
2	1807.	1682.	1876.	1655.	1478.	AVG. T4 =	1688.
3	1534.	1829.	1760.	1700.	1478.	AVG. T3 =	679.
4	1668.	1719.	1715.	1702.	1654.	PATTERN FAC.=	0.224
5	1459.	1665.	1756.	1882.	1914.	AVGT4-T3 =	1009.
0						MAXT4-AVGT4 =	226.
AVG.	1672.	1720.	1757.	1698.	1591.		
11	1300.	1459.	1546.	1592.	1527.	LINER POS.	3
12	1569.	1674.	1638.	1549.	1447.		
13	1758.	1801.	1768.	1645.	1456.	AVG. T4 =	1627.
14	1763.	1852.	1795.	1645.	1460.	AVG. T3 =	679.
15	1608.	1775.	1744.	1617.	1517.	PATTERN FAC.=	0.236
16	1542.	1624.	1692.	1727.	1734.	AVGT4-T3 =	948.
0						MAXT4-AVGT4 =	224.
AVG.	1590.	1698.	1697.	1629.	1523.		
23	1642.	1747.	1843.	1754.	1740.	LINER POS.	5
24	1761.	1833.	1877.	1772.	1595.		
25	1652.	1776.	1830.	1743.	1564.	AVG. T4 =	1620.
26	1571.		1697.	1621.	1474.	AVG. T3 =	679.
27	1421.	1524.	1500.		1389.	PATTERN FAC.=	0.273
28	1250.	1320.	1391.	1480.	1582.	AVGT4-T3 =	941.
0						MAXT4-AVGT4 =	257.
AVG.	1550.	1640.	1690.	1674.	1557.		
34	1481.	1664.	1751.	1903.	1842.	LINER POS.	7
35	1618.	1668.	1954.	1785.	1811.		
36	1637.	1791.	1845.	1874.	1709.	AVG. T4 =	1633.
37	1578.	1677.	1707.	1725.	1527.	AVG. T3 =	679.
38	1523.	1600.	1583.	1506.	1384.	PATTERN FAC.=	0.337
39	1379.	1382.	1377.	1365.	1333.	AVGT4-T3 =	954.
0						MAXT4-AVGT4 =	322.
AVG.	1536.	1630.	1703.	1693.	1601.		
46	1504.	1769.	1828.	1949.	1866.	LINER POS.	9
47	1681.	1835.		1843.	1739.		
48	1601.	1683.	1827.	1771.	1587.	AVG. T4 =	1655.
49	1639.	1665.	1711.	1613.	1417.	AVG. T3 =	679.
50	1529.	1627.		1580.	1519.	PATTERN FAC.=	0.301
51	1342.	1469.	1511.	1591.	1652.	AVGT4-T3 =	976.
0						MAXT4-AVGT4 =	294.
AVG.	1549.	1674.	1719.	1725.	1630.		

Fig. 4.1-33

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

RDG 103,104,105,RPM 7070,T2-79.5,T5-1051,DF-2ND 10 HR,10-23

INTEGRATED RADIAL PROFILE PLOTS

LINER POS.   1,3,5,7,9

```
        -200       -120         -40     0    40         120        200   ROW
 DIFF.  +.........+.........+.........+.........+.........+  AVERAGE
                                      1
 -68.3                   *            1                           1576.3
                                      1
                                      1
  29.1                                1 *                         1673.6
                                      1
                                      1
  68.2                                1      *                    1712.8
                                      1
                                      1
  39.5                                1  *                        1684.1
                                      1
                                      1
 -63.9                    *           1                           1580.7
                                      1
        +.........+.........+.........+.........+.........+
        -200       -120         -40     0    40         120        200
```

AVG. TT4 = 1644.6   TT3 = 679.0   DELTA T = 965.6
MAX. TT4 = 1954.5   PATTERN FACTOR =   0.321
AVG PATTERN FACTOR = 0.274   AVG INTEGRATED PATTERN FACTOR = 0.274

```
        -200       -120         -40     0    40         120        200   ROW
 DIFF.  +.........+.........+.........+.........+.........+  AVERAGE
                                      1
  -0.                                 *
                                      1
                                      1
  -0.                                 *
                                      1
                                      1
  -0.                                 *
                                      1
                                      1
  -0.                                 *
                                      1
                                      1
  -0.                                 *
                                      1
        +.........+.........+.........+.........+.........+
        -200       -120         -40     0    40         120        200
```

AVG. TT4 =   TT3 = 67[illegible].0   DELTA T =
MAX. TT4 =   0.   PATT[illegible]

Figure 4.1-34

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q2386B

RCG 106,107,108,RPM 6855,T2-79.0,T5-917.5,DF-2ND 10 HR;10-23

TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1416.	1474.	1488.	1443.	1407.
1		1590.	1584.	1460.	1298.
2	1642.	1531.	1679.	1469.	1302.
3	1666.	1651.	1574.	1510.	1318.
4	1505.	1547.	1530.	1502.	1452.
5	1346.	1537.	1629.	1732.	1741.
0					
AVG.	1515.	1555.	1581.	1519.	1420.

LINER POS. 1

AVG. T4 = 1518.
AVG. T3 = 630.
PATTERN FAC.= 0.251
AVGT4-T3 = 888.
MAXT4-AVGT4 = 223.

VANE	1	2	3	4	5
11	1127.	1254.	1317.	1347.	1312.
12	1374.	1463.	1428.	1364.	1286.
13	1544.	1581.	1562.	1468.	1309.
14	1560.	1659.	1609.	1486.	1324.
15	1418.	1589.	1588.	1497.	1430.
16	1362.	1477.	1556.	1602.	1633.
0					
AVG.	1398.	1504.	1510.	1461.	1382.

LINER POS. 3

AVG. T4 = 1451.
AVG. T3 = 630.
PATTERN FAC.= 0.253
AVGT4-T3 = 821.
MAXT4-AVGT4 = 208.

VANE	1	2	3	4	5
23	1346.	1444.	1551.	1499.	1493.
24	1477.	1549.	1618.	1553.	1408.
25	1459.	1572.	1630.	1550.	1392.
26	1471.		1564.	1465.	1325.
27	1347.	1460.	1427.		1271.
28	1174.	1253.	1327.	1399.	1463.
0					
AVG.	1379.	1456.	1519.	1493.	1392.

LINER POS. 5

AVG. T4 = 1446.
AVG. T3 = 630.
PATTERN FAC.= 0.226
AVGT4-T3 = 816.
MAXT4-AVGT4 = 184.

VANE	1	2	3	4	5
34	1359.	1508.	1570.	1703.	1663.
35	1430.	1422.	1746.	1598.	1650.
36	1457.	1608.	1649.	1658.	1524.
37	1396.	1484.	1518.	1519.	1328.
38	1323.	1406.	1413.	1356.	1247.
39	1232.	1246.	1249.	1236.	1203.
0					
AVG.	1366.	1446.	1524.	1512.	1436.

LINER POS. 7

AVG. T4 = 1457.
AVG. T3 = 630.
PATTERN FAC.= 0.350
AVGT4-T3 = 827.
MAXT4-AVGT4 = 289.

VANE	1	2	3	4	5
46	1363.	1568.	1600.	1683.	1602.
47	1482.	1625.		1616.	1522.
48	1423.	1511.	1616.	1561.	1393.
49	1452.	1483.	1522.	1441.	1273.
50	1361.	1447.		1423.	1371.
51	1216.	1336.	1379.	1445.	1477.
0					
AVG.	1383.	1495.	1529.	1528.	1440.

LINER POS. 9

AVG. T4 = 1471.
AVG. T3 = 630.
PATTERN FAC.= 0.252
AVGT4-T3 = 841.
MAXT4-AVGT4 = 212.

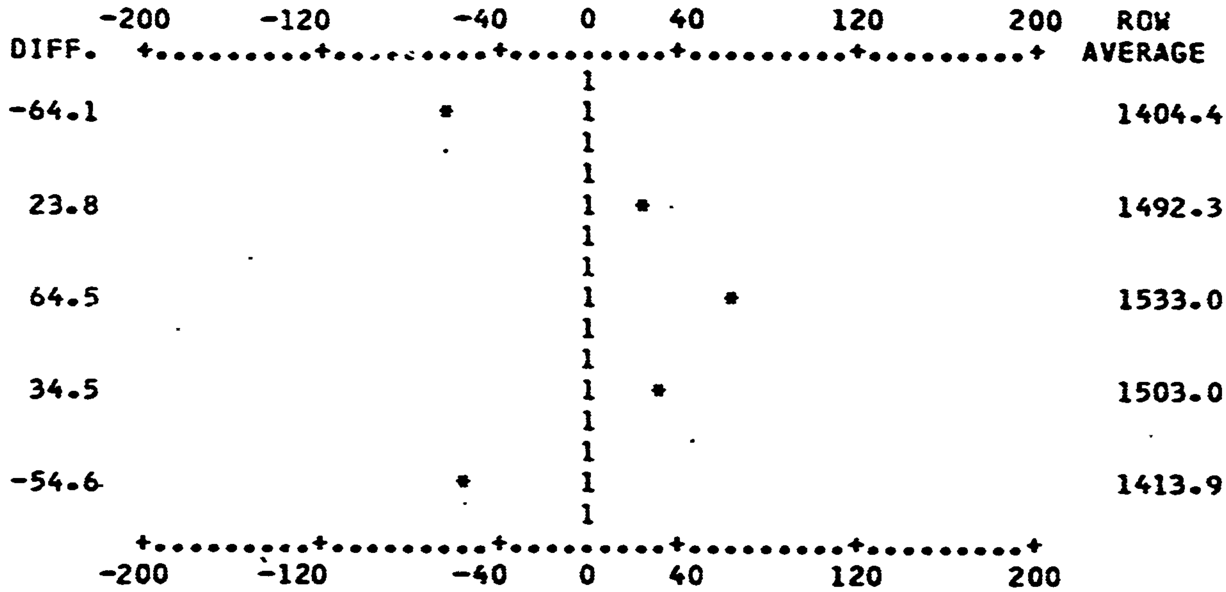
Fig. A 1-37

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 023868

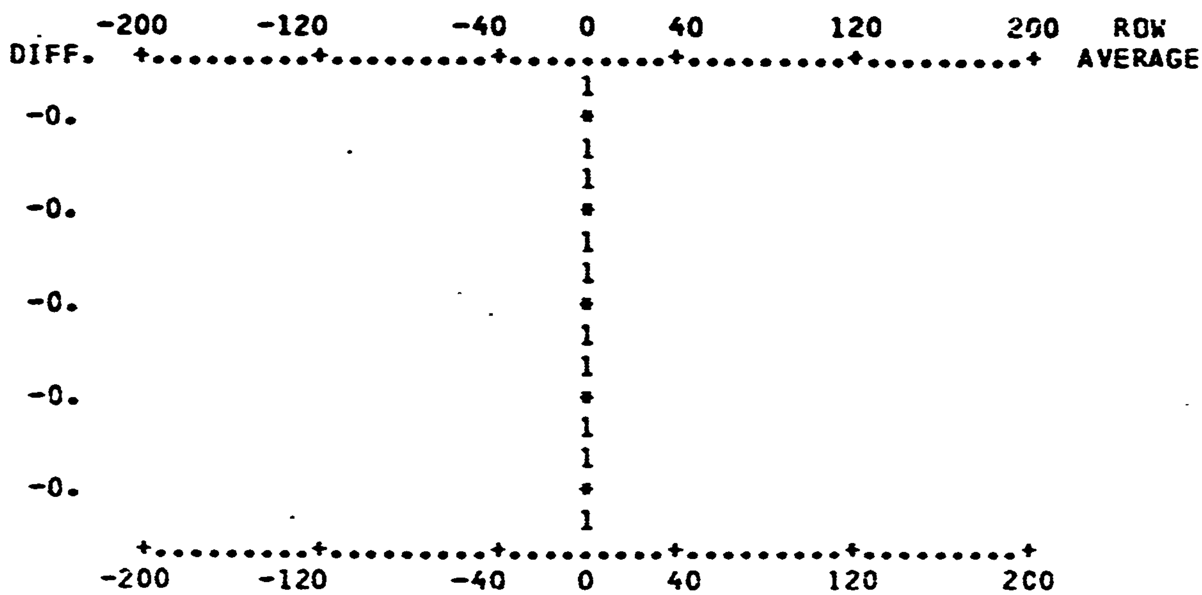
RDG 106,107,108,RPM 6855,T. 79.0,TS-917.5,DF=2ND 10 HR,10-23

INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9



AVG. TT4 = 1468.5 TT3 = 630.0 DELTA T = 838.5
MAX. TT4 = 1746.2 PATTERN FACTOR = 0.331
AVG PATTERN FACTOR = 0.266 AVG INTEGRATED PATTERN FACTOR = 0.266



AVG. TT4 = TT3 = 630.0 DELTA T =
MAX. TT4 = 0. PATTERN FACTOR = -1.000

Fig. 4.1-36

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q23868

RDG 120,121,122,RPM 6850,T2-68.0,T5-919.5,DF-2ND 10 HR,10-23
TABULATIC' TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5		
58	1408.	1466.	1488.	1449.	1418.	LINER POS.	1
1	1551.	1571.	1582.	1468.	1309.		
2	1619.	1502.	1680.	1513.	1330.	AVG. T4 =	1515.
3	1[illegible]40.	1639.	1562.	1527.	1339.	AVG. T3 =	621.
4	1459.	1572.	1581.	1579.	1541.	PATTERN FAC.=	0.184
5	1314.	1505.	1573.	1643.	1430.	AVGT4-T3 =	894.
0						MAXT4-AVGT4 =	165.
AVG.	1498.	1543.	1577.	1530.	1428.		
11	1099.	1230.	1293.	1324.	1276.	LINER POS.	3
12	1322.	1407.	1402.	1355.	1279.		
13	1485.	1538.	1551.	1483.	1327.	AVG. T4 =	1459.
14	1525.	1624.	1623.	1519.	1354.	AVG. T3 =	621.
15	1447.	1610.	1634.	1554.	1492.	PATTERN FAC.=	0.359
16	1396.	1529.	1630.	1711.	1760.	AVGT4-T3 =	838.
0						MAXT4-AVGT4 =	301.
AVG.	1379.	1490.	1522.	1491.	1415.		
23	1362.	1469.	1594.	1541.	1538.	LINER POS.	5
24	1476.	1552.	1637.	1584.	1431.		
25	1441.	1561.	1637.	1574.	1416.	AVG. T4 =	1463.
26	1476.	1631.	1550.	1462.	1327.	AVG. T3 =	621.
27	1357.	1462.	1429.		1274.	PATTERN FAC.=	0.207
28	1176.	1255.	1331.	1406.	1470.	AVGT4-T3 =	842.
0						MAXT4-AVGT4 =	174.
AVG.	1381.	1488.	1530.	1513.	1409.		
34	1354.	1487.	1548.	1685.	1656.	LINER POS.	7
35	1343.	1260.	1720.	1559.	1601.		
36	1515.	1657.	1660.	1561.	1517.	AVG. T4 =	1466.
37	1488.	1533.	1538.	1537.	1350.	AVG. T3 =	621.
38	1396.	1475.	1447.	1365.	1243.	PATTERN FAC.=	0.300
39	1282.	1293.	1292.	1275.	1237.	AVGT4-T3 =	845.
0						MAXT4-AVGT4 =	254.
AVG.	1396.	1451.	1534.	1514.	1434.		
46	1424.	1679.	1715.	1806.	1713.	LINER POS.	9
47	1607.	1762.		1680.	1593.		
48	1505.	1593.	1693.	1615.	1420.	AVG. T4 =	1495.
49	1495.	1505.	1532.	1452.	1270.	AVG. T3 =	621.
50	1332.	1410.		1361.	1301.	PATTERN FAC.=	0.357
51	1152.	1253.	1279.	1332.	1367.	AVGT4-T3 =	874.
0						MAXT4-AVGT4 =	312.
AVG.	1419.	1534.	1555.	1541.	1444.		

Fig. 4.1-37

```
            T4 PROFILE AND PATTERN EVALUATION PROGRAM - C2386B

          RDG 120,121,122,RPM 6850,T2-68.0,T5-919.5,DF-2ND 10 HR,10-23

                       INTEGRATED RADIAL PROFILE PLOTS

                           LINER POS.    1,3,5,7,9

         -200      -120         -40     0     40       120        200    ROW
  DIFF.   +.........+.........+.........+.........+.........+   AVERAGE
                                         1
  -64.6                        *         1                             1414.9
                                         1
                                         1
   21.6                                  1  *                          1501.0
                                         1
                                         1
   63.4                                  1       *                     1542.8
                                         1
                                         1
   38.5                                  1    *                        1517.9
                                         1
                                         1
  -53.4                         *        1                             1426.0
                                         1
          +.........+.........+.........+.........+.........+
         -200      -120         -40     0     40       120        200

     AVG. TT4 = 1479.4          TT3 =  621.0           DELTA T =   858.4
     MAX. TT4 = 1806.3            PATTERN FACTOR =     0.381
     AVG PATTERN FACTOR = 0.282        AVG INTEGRATED PATTERN FACTOR = 0.281


         -200      -120         -40     0     40       120        200    ROW
  DIFF.   +.........+.........+.........+.........+.........+   AVERAGE
                                         1
   -0.                                   *
                                         1
                                         1
   -C.                                   *
                                         1
                                         1
   -0.                                   *
                                         1
                                         1
   -0.                                   *
                                         1
                                         1
   -0.                                   *
                                         1
          +.........+.........+.........+.........+.........+
         -200      -120         -40     0     40       120        200

     AVG. TT4 =                 TT3 =  621.0           DELTA T =
     MAX. TT4 =      C            PATTERN FACTOR =   -1.000
```

Fig. 4.1-38

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q23868

RDG 123,124,125,RPM 7275,T2-77.0,T5-1162,DF-3RD 10 HR,10-25
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1800.	1873.	1850.	1750.	1660.
1		1962.	1967.	1794.	1583.
2	1978.	1814.	2082.	1858.	1635.
3	1974.	1988.	1933.	1869.	1620.
4	1659.	1828.	1836.	1826.	1761.
5	1465.	1647.	1698.	1759.	1762.
0					
AVG.	1775.	1852.	1894.	1809.	1670.

LINER POS. 1

AVG. T4 = 1801.
AVG. T3 = 715.
PATTERN FAC.= 0.258
AVGT4-T3 = 1086.
MAXT4-AVGT4 = 281.

VANE	1	2	3	4	5
11	1380.	1537.	1621.	1659.	1592.
12	1773.	1887.	1827.	1679.	1552.
13	2038.	2054.	1991.	1835.	1618.
14	1952.	2053.	1983.	1826.	1642.
15	1745.	1878.	1880.	1795.	1740.
16	1611.	1700.	1792.	1858.	1910.
0					
AVG.	1750.	1851.	1849.	1776.	1676.

LINER POS. 3

AVG. T4 = 1780.
AVG. T3 = 715.
PATTERN FAC.= 0.257
AVGT4-T3 = 1065.
MAXT4-AVGT4 = 274.

VANE	1	2	3	4	5
23	1731.	1912.	1970.	1837.	1811.
24	1844.	1956.	2035.	1902.	1697.
25	1708.	1891.	1979.	1909.	1700.
26	1768.	1913.	1836.	1777.	1629.
27	1598.	1721.	1701.		1581.
28	1339.	1428.	1500.	1579.	1642.
0					
AVG.	1665.	1804.	1837.	1801.	1677.

LINER POS. 5

AVG. T4 = 1755.
AVG. T3 = 715.
PATTERN FAC.= 0.269
AVGT4-T3 = 1040.
MAXT4-AVGT4 = 280.

VANE	1	2	3	4	5
34	1530.	1677.	1752.	1949.	2004.
35	1622.		1934.	1804.	1886.
36	1582.	1741.	1834.	1949.	1789.
37	1632.	1751.	1801.	1872.	1682.
38	1680.	1813.	1819.	1708.	1539.
39	1695.	1736.	1761.	1759.	1701.
0					
AVG.	1624.	1744.	1817.	1840.	1767.

LINER POS. 7

AVG. T4 = 1759.
AVG. T3 = 715.
PATTERN FAC.= 0.235
AVGT4-T3 = 1044.
MAXT4-AVGT4 = 245.

VANE	1	2	3	4	5
46	1628.	1937.	1964.	2057.	1999.
47	1984.	2143.	2121.	1961.	1824.
48	1867.	1952.	2058.	1955.	1705.
49	1858.	1870.	1913.	1772.	1515.
50	1647.	1761.		1677.	1586.
51	1401.	1525.	1562.	1651.	1734.
0					
AVG.	1731.	1865.	1924.	1846.	1727.

LINER POS. 9

AVG. T4 = 1815.
AVG. T3 = 715.
PATTERN FAC.= 0.298
AVGT4-T3 = 1100.
MAXT4-AVGT4 = 328.

Fig. 5.3-9

T4 PROFILE AND PATTERN EVALUATION PROGRAM - C23868

RDG 123,124,125,RPM 7275,T2-77.0,T5-1162,DF-3RD 10 HR,10=25

INTEGRATED RADIAL PROFILE PLOTS

LINER POS.   1,3,5,7,9

```
        -200      -120      -40    0   40       120       200   ROW
DIFF.     +.........+.........+.........+.........+.........+   AVERAGE
                                   1
-75.4                     *        1                               1706.6
                                   1
                                   1
 43.8                              1    *                          1825.8
                                   1
                                   1
 80.2                              1         *                     1862.1
                                   1
                                   1
 32.8                              1   *                           1814.7
                                   1
                                   1
-78.7                    *         1                               1703.3
                                   1
          +.........+.........+.........+.........+.........+
        -200      -120      -40    0   40       120       200
```

AVG. TT4 = 1782.0   TT3 = 715.0   DELTA T = 1067.0
MAX. TT4 = 2143.0   PATTERN FACTOR = 0.338
AVG PATTERN FACTOR = 0.264   AVG INTEGRATED PATTERN FACTOR = 0.264

```
        -200      -120      -40    0   40       120       200   ROW
DIFF.     +.........+.........+.........+.........+.........+   AVERAGE
                                   1
 -0.                               *
                                   1
                                   1
 -0.                               *
                                   1
                                   1
 -0.                               *
                                   1
                                   1
 -0.                               *
                                   1
                                   1
 -0.                               *
                                   1
          +.........+.........+.........+.........+.........+
        -200      -120      -40    0   40       120       200
```

AVG. TT4 =   TT3 = 715.0   DELTA T =
MAX. TT4 =   0.   PATTERN FACTOR = -1.000

Fig. 4.1-40

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 073868

RDG 127,128,129,RPM 7255,T2-78.0,T5-1158,DF-3RC 10 HR,10-25
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1771.	1806.	1764.	1654.	1565.
1		1914.	1924.	1766.	1552.
2	1936.	1771.	2061.	1860.	1641.
3	1905.	1935.	1917.	1886.	1635.
4	1729.	1861.	1889.	1911.	1838.
5	1380.	1538.	1596.	1636.	1614.
0					
AVG.	1744.	1804.	1859.	1785.	1641.
11	1425.	1575.	1632.	1662.	1615.
12	1731.	1910.	1846.	1694.	1559.
13	1901.	2016.	1989.	1838.	1613.
14	1875.	2003.	1961.	1819.	1633.
15	1705.	1833.	1868.	1796.	1743.
16	1599.	1697.	1789.	1853.	1914.
0					
AVG.	1715.	1839.	1848.	1777.	1679.
23	1642.	1887.	1931.	1805.	1766.
24	1897.	1995.	2041.	1895.	1681.
25	1797.	1966.	2001.	1909.	1694.
26	1828.	1973.	1848.	1784.	1625.
27	1564.	1676.	1656.		1552.
28	1332.	1406.	1460.	1536.	1615.
0					
AVG.	1677.	1817.	1823.	1786.	1656.
34	1554.	1704.	1760.	1988.	1973.
35	1608.		1947.	1834.	1935.
36	1533.	1714.	1819.	1956.	1818.
37	1589.	1711.	1784.	1875.	1682.
38	1643.	1768.	1793.	1709.	1552.
39	1638.	1675.	1692.	1684.	1627.
0					
AVG.	1594.	1714.	1799.	1841.	1765.
46	1599.	1876.	1895.	1982.	1886.
47	1938.	2104.	2066.	1917.	1790.
48	1828.	1916.	1977.	1948.	1711.
49	1847.	1847.	1898.	1757.	1505.
50	1660.	1772.		1693.	1605.
51	1407.	1537.	1585.	1688.	1792.
0					
AVG.	1713.	1842.	1884.	1831.	1715.

LINER POS. 1

AVG. T4 = 1767.
AVG. T3 = 714.
PATTERN FAC.= 0.279
AVGT4-T3 = 1054.
MAXT4-AVGT4 = 294.

LINER POS. 3

AVG. T4 = 1772.
AVG. T3 = 714.
PATTERN FAC.= 0.231
AVGT4-T3 = 1058.
MAXT4-AVGT4 = 244.

LINER POS. 5

AVG. T4 = 1751.
AVG. T3 = 714.
PATTERN FAC.= 0.281
AVGT4-T3 = 1037.
MAXT4-AVGT4 = 291.

LINER POS. 7

AVG. T4 = 1744.
AVG. T3 = 714.
PATTERN FAC.= 0.237
AVGT4-T3 = 1030.
MAXT4-AVGT4 = 244.

LINER POS. 9

AVG. T4 = 1794.
AVG. T3 = 714.
PATTERN FAC.= 0.286
AVGT4-T3 = 1081.
MAXT4-AVGT4 = 310.

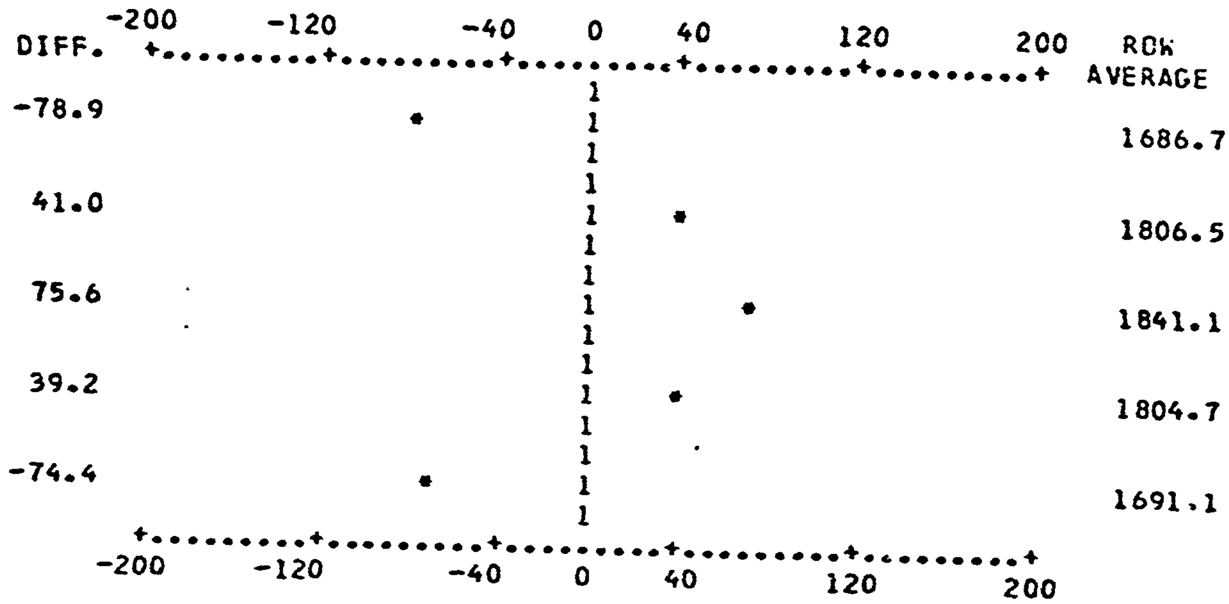
Fig. 4.1-41

T4 PROFILE AND PATTERN EVALUATION PROGRAM - C2386B

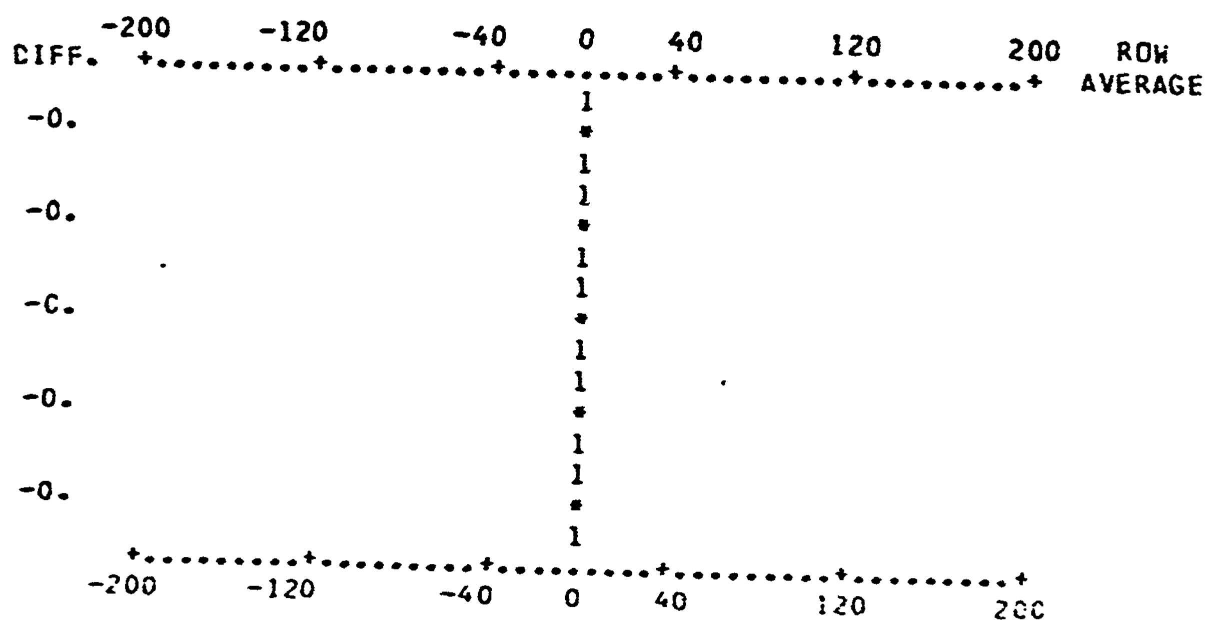
RDG 127,128,129,RPM 7255,T2-78.0,T5-1158,DF-3RD 10 HR,10-25

INTEGRATED RACIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9



AVG. TT4 = 1765.5
MAX. TT4 = 2103.7
TT3 = 713.5
DELTA T = 1052.0
PATTERN FACTOR = 0.321
AVG PATTERN FACTOR = 0.263
AVG INTEGRATED PATTERN FACTOR = 0.263



AVG. TT4 =
MAX. TT4 =
TT3 = 713.5
DELTA T =

Fig. 4.42

T4 PROFILE ANC PATTERN EVALUATION PROGRAM - C2386B

RCG 133,134,135,RPM 7110,T2-79.0,T5-1050,CF-3RC 10 HR,10-25
TABULATION TT4 THERMOCCUPLES (DEGREES F)

VANE	1	2	3	4	5		
58	1672.	1734.	1735.	1655.	1592.	LINER POS.	1
1		1819.	1819.	1666.	1468.		
2	1825.	1664.	1904.	1690.	1492.	AVG. T4 =	1646.
3	1764.	1792.	1767.	1720.	1498.	AVG. T3 =	683.
4	1559.	1656.	1673.	1679.	1620.	PATTERN FAC.=	0.268
5	1304.	1457.	1494.	1521.	1487.	AVGT4-T3 =	963.
0						MAXT4-AVGT4 =	258.
AVG.	1625.	1687.	1732.	1655.	1526.		
11	1268.	1400.	1460.	1473.	1455.	LINER POS.	3
12	1608.	1704.	1653.	1539.	1426.		
13	1782.	1850.	1825.	1712.	1523.	AVG. T4 =	1646.
14	1727.	1860.	1837.	1733.	1580.	AVG. T3 =	683.
15	1586.	1724.	1786.	1718.	1662.	PATTERN FAC.=	0.222
16	1515.	1622.	1717.	1787.	1842.	AVGT4-T3 =	963.
0						MAXT4-AVGT4 =	214.
AVG.	1581.	1693.	1713.	1660.	1581.		
23	1598.	1809.	1889.	1796.	1749.	LINER POS.	5
24	1749.	1844.	1906.	1757.	1610.		
25	1590.	1761.	1814.	1761.	1591.	AVG. T4 =	1623.
26	1578.		1674.	1647.	1521.	AVG. T3 =	683.
27	1413.	1507.	1494.		1434.	PATTERN FAC.=	0.301
28	1258.	1326.	1385.	1459.	1528.	AVGT4-T3 =	940.
C						MAXT4-AVGT4 =	283.
AVG.	1531.	1649.	1694.	1684.	1572.		
34	1386.	1519.	1574.	1718.	1669.	LINER POS.	7
35	1516.		1799.	1639.	1666.		
36	1552.	1709.	1738.	1788.	1609.	AVG. T4 =	1630.
37	1643.	1664.	1701.	1730.	1533.	AVG. T3 =	683.
38	1663.	1752.	1688.	1549.	1398.	PATTERN FAC.=	0.179
39	1625.	1637.	1633.	1608.	1551.	AVGT4-T3 =	947.
0						MAXT4-AVGT4 =	170.
AVG.	1564.	1656.	1689.	1672.	1571.		
46	1548.	1753.	1766.	1847.	1753.	LINER POS.	9
47	1706.	1861.	1864.	1765.	1672.		
48	1581.	1728.	1772.	1779.	1580.	AVG. T4 =	1675.
49	1625.	1687.	1764.	1668.	1444.	AVG. T3 =	683.
50	1573.	1686.		1639.	1568.	PATTERN FAC.=	0.191
51	1386.	1529.	1581.	1685.	1762.	AVGT4-T3 =	992.
0						MAXT4-AVGT4 =	189.
AVG.	1570.	1707.	1749.	1730.	1630.		

Fig. 4.1-43

```
           T4 PROFILE AND PATTERN EVALUATION PROGRAM - C23868

      RDG 133,134,135,RPM 7110,T2-79.0,T5-1050,DF-3RD 10 HR,10-25

                    INTEGRATED RADIAL PROFILE PLOTS

                      LINER POS.   1,3,5,7,9

        -200      -120       -40   0    40      120       200   RCW
 DIFF.  +.........+.........+.........+.........+.........+  AVERAGE
                                   1
 -71.4                    *        1                           1572.6
                                   1
                                   1
  36.5                             1    *                      1680.6
                                   1
                                   1
  70.2                             1       *                   1714.2
                                   1
                                   1
  36.2                             1    *                      1680.2
                                   1
                                   1
 -67.9                     *       1                           1576.1
                                   1
        +.........+.........+.........+.........+.........+
        -200      -120       -40   0    40      120       200

   AVG. TT4 = 1644.0        TT3 =  683.0        DELTA T =  961.0
   MAX. TT4 = 1905.8          PATTERN FACTOR =    0.272
   AVG PATTERN FACTOR = 0.232    AVG INTEGRATED PATTERN FACTOR = 0.232

        -200      -120       -40   0    40      120       200   RCW
 DIFF.  +.........+.........+.........+.........+.........+  AVERAGE
                                   1
  -0.                              *
                                   1
                                   1
  -0.                              *
                                   1
                                   1
  -0.                              *
                                   1
                                   1
  -0.                              *
                                   1
                                   1
  -0.                              *
                                   1
        +.........+.........+.........+.........+.........+
        -200      -120       -40   0    40      120       200

   [illegible]                TT3 = [illegible]      DELTA T = [illegible]
```

Fig. 4.1 44

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 023868

RDG 146,147,148,RPM 7080,T2-76.0,T5-1052,DF-3RD 10 HR,10-25
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1631.	1679.	1720.	1666.	1586.
1		1774.	1806.	1676.	1504.
2	1805.	1624.	1887.	1694.	1506.
3	1682.	1766.	1739.	1692.	1476.
4	1527.	1458.	1652.	1650.	1565.
5	1413.	1595.	1655.	1744.	1752.
0					
AVG.	1611.	1649.	1743.	1687.	1565.

LINER POS. 1

AVG. T4 = 1653.
AVG. T3 = 678.
PATTERN FAC.= 0.241
AVGT4-T3 = 975.
MAXT4-AVGT4 = 235.

VANE	1	2	3	4	5
11	1353.	1543.	1636.	1580.	1630.
12	1721.	1806.	1735.	1600.	1467.
13	1803.	1870.	1807.	1660.	1449.
14	1755.	1868.	1809.	1640.	1449.
15	1620.	1690.	1673.	1538.	1424.
16	1488.	1536.	1565.	1560.	1573.
0					
AVG.	1624.	1719.	1704.	1596.	1499.

LINER POS. 3

AVG. T4 = 1626.
AVG. T3 = 678.
PATTERN FAC.= 0.254
AVGT4-T3 = 950.
MAXT4-AVGT4 = 241.

VANE	1	2	3	4	5
23	1408.	1789.	1883.	1791.	1706.
24	1756.	1848.	1920.	1813.	1620.
25	1562.	1751.	1788.	1651.	1592.
26	1495.		1628.	1624.	1514.
27	1381.	1470.	1460.		1412.
28	1171.	1239.	1285.	1334.	1358.
0					
AVG.	1462.	1619.	1661.	1643.	1534.

LINER POS. 5

AVG. T4 = 1580.
AVG. T3 = 678.
PATTERN FAC.= 0.376
AVGT4-T3 = 902.
MAXT4-AVGT4 = 339.

VANE	1	2	3	4	5
34	1452.	1593.	1679.	1874.	1896.
35	1520.		1863.	1706.	1743.
36	1619.	1542.	1775.	1832.	1634.
37	1688.	1553.	1629.	1664.	1539.
38	1670.	1719.	1627.	1516.	1375.
39	1453.	1442.	1423.	1388.	1341.
0					
AVG.	1567.	1570.	1666.	1663.	1588.

LINER POS. 7

AVG. T4 = 1612.
AVG. T3 = 678.
PATTERN FAC.= 0.304
AVGT4-T3 = 934.
MAXT4-AVGT4 = 284.

VANE	1	2	3	4	5
46	1478.	1722.	1741.	1840.	1743.
47	1718.	1881.	1884.	1757.	1657.
48	1683.	1786.	1642.	1731.	1568.
49	1752.	1728.	1694.	1620.	1401.
50	1592.	1679.		1560.	1484.
51	1333.	1456.	1487.	1561.	1591.
0					
AVG.	1593.	1709.	1690.	1678.	1574.

LINER POS. 9

AVG. T4 = 1647.
AVG. T3 = 678.
PATTERN FAC.= 0.244
AVGT4-T3 = 969.
MAXT4-AVGT4 = 237.

Fig. 4.1-45

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q23868

RCG 146,147,148,RPM 7080,T2-76.0,T5-1052,DF-3RD 10 HR,10-25

INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9

```
        -200      -120       -40    0    40       120       200    ROW
DIFF.    +.........+.........+.........+.........+.........+     AVERAGE
                                    1
-54.3                     *         1                              1570.2
                                    1
                                    1
 32.9                               1   *                          1657.4
                                    1
                                    1
 68.3                               1        *                     1692.8
                                    1
                                    1
 29.4                               1   *                          1653.9
                                    1
                                    1
-72.6                   *           1                              1551.9
                                    1
         +.........+.........+.........+.........+.........+
        -200      -120       -40    0    40       120       200
```

AVG. TT4 = 1624.5 TT3 = 678.0 DELTA T = 946.5
MAX. TT4 = 1919.8 PATTERN FACTOR = 0.312
AVG PATTERN FACTOR = 0.284 AVG INTEGRATED PATTERN FACTOR = 0.282

```
        -200      -120       -40    0    40       120       200    ROW
DIFF.    +.........+.........+.........+.........+.........+     AVERAGE
                                    1
 -0.                                *
                                    1
                                    1
 -0.                                *
                                    1
                                    1
 -0.                                *
                                    1
                                    1
 -0.                                *
                                    1
                                    1
 -0.                                *
                                    1
         +.........+.........+.........+.........+.........+
        -200      -120       -40    0    40       120       200
```

AVG. TT4 = TT3 = 678.0 DELTA T =
MAX. TT4 = 0. PATTERN FACTOR = -1.[illegible]

Fig. 4.1-46

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q23868

RDG 155,156,157,RPM 6856,T2-74.0,T5=920,DF-3RD 10 HR,10-25
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5
58	1481.	1553.	1633.	1631.	1588.
1		1590.	1641.	1552.	1411.
2	1566.	1427.	1644.	1480.	1318.
3	1433.	1507.	1481.	1443.	1286.
4	1243.	1210.	1372.	1364.	1297.
5	1173.	1313.	1346.	1380.	1354.
0					
AVG.	1379.	1433.	1520.	1475.	1376.

LINER POS. 1

AVG. T4 = 1439.
AVG. T3 = 627.
PATTERN FAC.= 0.252
AVGT4-T3 = 812.
MAXT4-AVGT4 = 205.

VANE	1	2	3	4	5
11	1196.	1331.	1392.	1342.	1431.
12	1442.	1518.	1477.	1393.	1299.
13	1542.	1625.	1603.	1510.	1326.
14	1555.	1676.	1639.	1500.	1335.
15	1472.	1547.	1550.	1431.	1333.
16	1340.	1420.	1454.	1457.	1486.
0					
AVG.	1425.	1519.	1519.	1439.	1368.

LINER POS. 3

AVG. T4 = 1454.
AVG. T3 = 627.
PATTERN FAC.= 0.268
AVGT4-T3 = 828.
MAXT4-AVGT4 = 221.

VANE	1	2	3	4	5
23	1156.	1548.	1679.	1619.	1508.
24	1518.	1587.	1679.	1625.	1452.
25	1416.	1511.	1564.	1402.	1414.
26	1309.		1442.	1445.	1345.
27	1260.	1344.	1325.		1249.
28	1059.	1123.	1168.	1209.	1215.
0					
AVG.	1286.	1423.	1476.	1460.	1364.

LINER POS. 5

AVG. T4 = 1399.
AVG. T3 = 627.
PATTERN FAC.= 0.363
AVGT4-T3 = 773.
MAXT4-AVGT4 = 280.

VANE	1	2	3	4	5
34	1310.	1421.	1493.	1666.	1719.
35	1281.		1612.	1477.	1509.
36	1426.	1330.	1570.	1604.	1445.
37	1528.	1297.	1438.	1333.	1362.
38	1512.	1565.	1483.	1372.	1246.
39	1373.	1375.	1362.	1332.	1295.
0					
AVG.	1405.	1398.	1493.	1464.	1429.

LINER POS. 7

AVG. T4 = 1439.
AVG. T3 = 627.
PATTERN FAC.= 0.345
AVGT4-T3 = 813.
MAXT4-AVGT4 = 280.

VANE	1	2	3	4	5
46	1350.	1551.	1568.	1662.	1570.
47	1506.	1683.	1695.	1579.	1500.
48	1491.	1616.	1433.	1517.	1386.
49	1550.	1520.	1451.	1440.	1251.
50	1387.	1452.		1356.	1285.
51	1143.	1252.	1270.	1313.	1289.
0					
AVG.	1405.	1512.	1484.	1478.	1380.

LINER POS. 9

AVG. T4 = 1451.
AVG. T3 = 627.
PATTERN FAC.= 0.297
AVGT4-T3 = 824.
MAXT4-AVGT4 = 245.

Fig. 4.1-47

T4 PROFILE AND PATTERN EVALUATION PROGRAM - C23868

RDG 155,156,157,RPM 6856,T2-74.0,T5-920,DF-3RD 10 HR,10-25

INTEGRATED RADIAL PROFILE PLOTS

LINER POS.   1,3,5,7,9

```
          -200      -120          -40    0    40       120       200   ROW
DIFF.      +.........+.........+.........+.........+.........+  AVERAGE
                                       1
-56.8                          *       1                           1379.9
                                       1
                                       1
 23.7                                  1  *                        1460.4
                                       1
                                       1
 62.1                                  1      *                    1498.8
                                       1
                                       1
 26.7                                  1  *                        1463.4
                                       1
                                       1
-53.2                          *       1                           1383.5
                                       1
           +.........+.........+.........+.........+.........+
          -200      -120          -40    0    40       120       200
```

AVG. TT4 = 1436.7   TT3 = 626.5   DELTA T = 810.2
MAX. TT4 = 1719.3   PATTERN FACTOR =   0.349
AVG PATTERN FACTOR = 0.305   AVG INTEGRATED PATTERN FACTOR = 0.034

```
          -200      -120          -40    0    40       120       200   ROW
DIFF.      +.........+.........+.........+.........+.........+  AVERAGE
                                       1
 -0.                                   *
                                       1
                                       1
 -0.                                   *
                                       1
                                       1
 -0.                                   *
                                       1
                                       1
 -0.                                   *
                                       1
                                       1
 -0.                                   *
                                       1
           +.........+.........+.........+.........+.........+
          -200      -120          -40    0    40       120       200
```

AVG. TT4 =   TT3 = 626.5   DELTA T =

Fig. 4.1-40

T4 PROFILE AND PATTERN EVALUATION PROGRAM - Q23868

RDG 167,168,169,RPM 6850,T2-65.0,T5-919,DF-3RD 10 HR,10-25
TABULATION TT4 THERMOCOUPLES (DEGREES F)

VANE	1	2	3	4	5		
58	1433.	1491.	1557.	1543.	1500.	LINER POS.	1
1		1552.	1600.	1515.	1372.		
2	1571.	1432.	1693.	1508.	1343.	AVG. T4 =	1462.
3	1510.	1597.	1532.	1502.	1330.	AVG. T3 =	618.
4	1252.	104[illegible].	1468.	1461.	1388.	PATTERN FAC.=	0.274
5	125[illegible].	141[illegible].	1472.	1531.	1517.	AVGT4-T3 =	844.
0						MAXT4-AVGT4 =	231.
AVG.	1403.	1423.	1554.	1510.	1408.		
11	1121.	1236.	1274.	1209.	1279.	LINER POS.	3
12	1389.	1474.	1424.	1331.	1243.		
13	1610.	1680.	1513.	1498.	1306.	AVG. T4 =	1443.
14	1642.	1758.	1680.	1503.	1327.	AVG. T3 =	618.
15	1496.	1587.	1578.	1444.	1337.	PATTERN FAC.=	0.382
16	1372.	1451.	1489.	1503.	1536.	AVGT4-T3 =	825.
0						MAXT4-AVGT4 =	315.
AVG.	1438.	1531.	1493.	1415.	1338.		
23	1158.	1563.	1688.	1623.	1519.	LINER POS.	5
24	1538.	1616.	1707.	1501.	1458.		
25	1721.	1550.	1596.	1340.	1415.	AVG. T4 =	1426.
26	1335.		1447.	1455.	1340.	AVG. T3 =	618.
27	1258.	1341.	1321.		1238.	PATTERN FAC.=	0.364
28	[illegible]	181.	1242.	1307.	1363.	AVGT4-T3 =	808.
0						MAXT4-AVGT4 =	295.
AVG.	[illegible]	1450.	1500.	1445.	1389.		
34	1259.	1365.	1424.	1567.	1568.	LINER POS.	7
35	1269.		1615.	1482.	1511.		
36	1416.	1265.	1562.	1609.	1458.	AVG. T4 =	1408.
37	1491.	1134.	1426.	1275.	1366.	AVG. T3 =	618.
38	1480.	1534.	1473.	1368.	1236.	PATTERN FAC.=	0.262
39	1367.	1367.	1355.	1322.	127[illegible].	AVGT4-T3 =	790.
0						MAXT4-AVGT4 =	207.
AVG.	1380.	1333.	1476.	1437.	1402.		
46	1393.	1604.	1606.	1687.	1582.	LINER POS.	9
47	1591.	1764.	1752.	1593.	1492.		
48	1519.	1704.	1322.	1517.	1379.	AVG. T4 =	1453.
49	1518.	1507.	1457.	1447.	1249.	AVG. T3 =	618.
50	1338.	1407.		1336.	1269.	PATTERN FAC.=	0.373
51	1115.	1215.	1235.	1281.	1259.	AVGT4-T3 =	835.
0						MAXT4-AVGT4 =	311.
AVG.	1413.	1534.	1475.	1477.	1372.		

T4 PROFILE AND PATTERN EVALUATION PROGRAM - 023868

RDG 167,168,169,RPM 6850,T2-65.0,T5-919,DF-3RD 10 HR,10-25

INTEGRATED RADIAL PROFILE PLOTS

LINER POS. 1,3,5,7,9

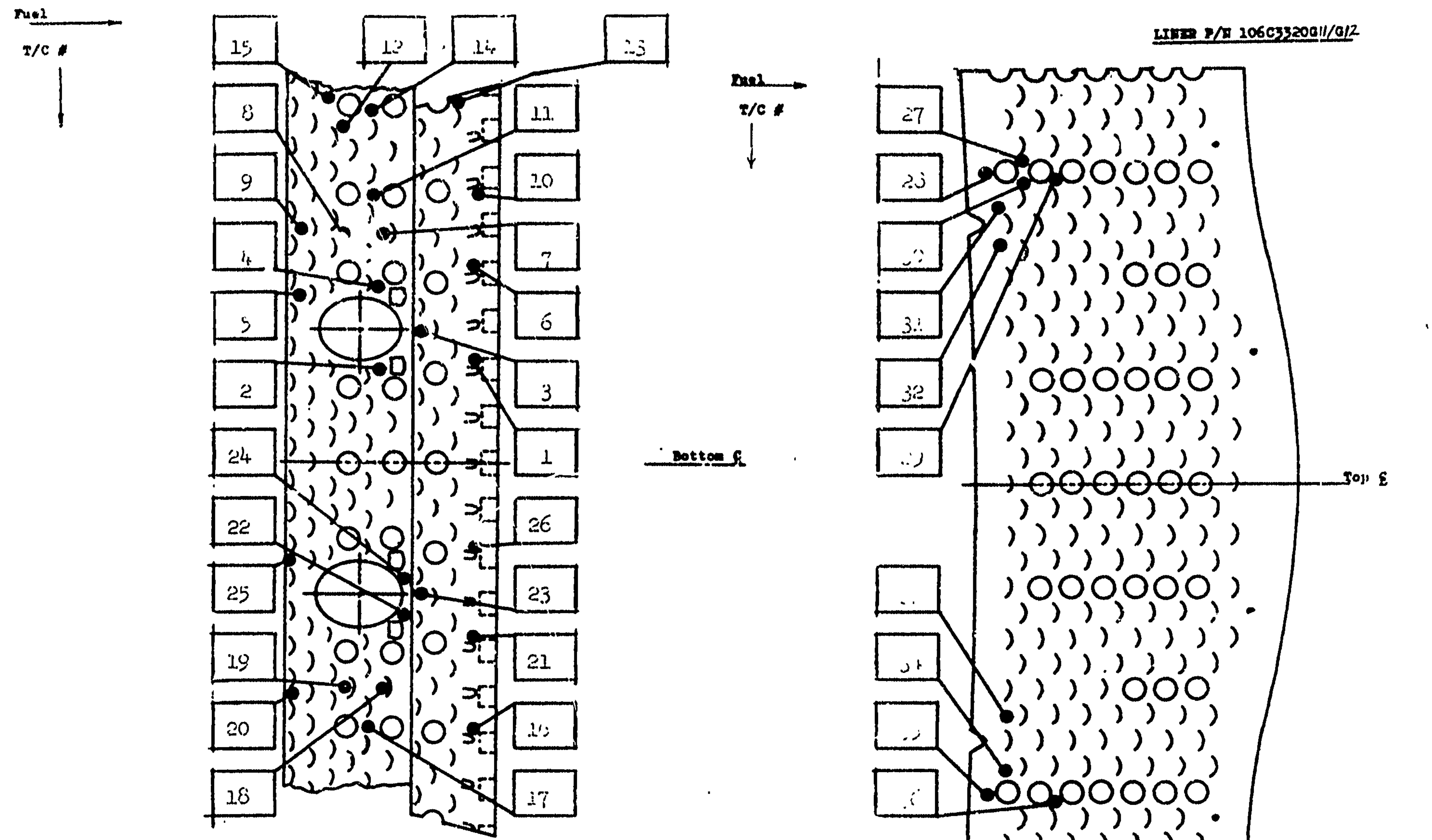
```
        -200     -120         -40    0     40        120         200   ROW
DIFF.    +.........+.........+.........+.........+.........+.........+  AVERAGE
                                       I
 -40.9                           *     I                                 1397.6
                                       I
                                       I
  20.0                                 I  *                              1458.6
                                       I
                                       I
  61.8                                 I       *                         1500.3
                                       I
                                       I
  18.7                                 I *                               1457.2
                                       I
                                       I
 -56.8                          *      I                                 1381.7
                                       I
         +.........+.........+.........+.........+.........+.........+
        -200     -120         -40    0     40        120         200
```

AVG. TT4 = 1438.6 TT3 = 618.0 DELTA T = 820.6
MAX. TT4 = 1764.3 PATTERN FACTOR = 0.397
AVG PATTERN FACTOR = 0.331 AVG INTEGRATED PATTERN FACTOR = 0.331

```
        -200     -120         -40    0     40        120         200   ROW
DIFF.    +.........+.........+.........+.........+.........+.........+  AVERAGE
                                       I
  -0.                                  *
                                       I
                                       I
  -0.                                  *
                                       I
                                       I
  -0.                                  *
                                       I
                                       I
  -0.                                  *
                                       I
                                       I
  -0.                                  *
                                       I
         +.........+.........+.........+.........+.........+.........+
        -200     -120         -40    0     40        120         200
```

AVG. TT4 = TT3 = 618.0 DELTA T =
[illegible]

Fig. 4.2-50



LINER P/N 106C3320G11/G12
Fuel
T/C #
Bottom ℄
Top ℄
15
12
14
13
8
9
4
5
2
24
22
25
19
20
18
11
10
7
6
3
1
26
23
21
17
27
28
31
32

RCG 2,6900 RPM,T2-77.0,T5-920,JP-5 FUEL,10-15-63

LINER CAN 10 TEMP 1-26

	1	2
1	1459.	C
2	1414.	1131.
3	1325.	1187.
4	1347.	1378.
5	1458.	1194.
6	1162.	1176.
7	1403.	1342.
8	1198.	1179.
9	1272.	1356.
10	1431.	1465.
11	1299.	1370.
12	1603.	1432.
13	1225.	1342.
CCL.AVE.	1353.8	1296.1

CVERALL AVERAGE 1326.10 TMAX 1603. TMIN 1131.

LINER CAN 10 TEMP 27-36

	1	2
1	1094.	1080.
2	1269.	1356.
3	1187.	1120.
4	1246.	1058.
5	1207.	1114.
CCL.AVE.	1200.9	1145.7

CVERALL AVERAGE 1173.29 TMAX 1356. TMIN 1058.

LINER CAN 4 TEMP 1-26

	1	2
1	1413.	1121.
2	1393.	1079.
3	1273.	1274.
4	1205.	1226.
5	1216.	1190.
6		1042.
7	1536.	1198.
8	1270.	1153.
9	1200.	1230.
10	1273.	1374.
11	1139.	1336.
12	1095.	1188.
13	1089.	1081.
COL.AVE.	1258.5	1191.6

CVERALL AVERAGE 1223.74 TMAX 1536. TMIN 1042.

RDG 2,6900 RPM,T2-77.0,T5-920,JP-5 FUEL,10-15-63

LINER CAN 4 TEMP 27-36

	1	2				
1	973.	927.				
2	1107.	1106.				
3	858.	1045.				
4	841.	993.				
5	1043.	1042.				
COL.AVE.	964.3	1022.8				
OVERALL AVERAGE		993.55	TMAX	1107.	TMIN	841.

DIAPHRAGM TEMPERATURES

	1	2	3	4		
1	1352.	1365.	1393.	1292.		
2	1217.	1306.	1362.	1357.		
3	1380.	1296.	1427.	1335.		
4	1472.	1340.	1388.	1357.		
5	1426.	1211.	1357.	1342.		
6	1439.	1431.	1450.			
7	1207.		1159.	1189.		
8	1160.	1173.	1201.	1142.		
9	1147.	1143.	1169.	1145.		
10	1161.	1073.	1111.	1145.		
11		1297.	1191.	1172.		
12	1152.	1162.	797.	794.		
13	896.	886.	673.	650.		
COL.AVE.	1250.9	1223.8	1206.1	1160.0		
OVERALL AVERAGE		1210.09	TMAX	1472.	TMIN	650.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1282.4	1158.0	1220.2

Fig [illegible]

RCG 6,7100 RPM,T2-77.0,T5-1C50,JP-5 FUEL:10-15-63

LINER CAN 10 TEMP 1-26

	1	2
1	1553.	C
2	1473.	1183.
3	1380.	1260.
4	1431.	1463.
5	1545.	1303.
6	1256.	1268.
7	1532.	1437.
8	1285.	1290.
9	1353.	1415.
10	1502.	1551.
11	1354.	1374.
12	1617.	1460.
13	1253.	1405.
CCL.AVE.	1425.7	1367.3

CVERALL AVERAGE 1397.68 TMAX 1617. TMIN 1183.

LINER CAN 10 TEMP 27-36

	1	2
1	1190.	1147.
2	1392.	1466.
3	1244.	1205.
4	1316.	1156.
5	1292.	1194.
CCL.AVE.	1287.0	1233.8

CVERALL AVERAGE 1260.40 TMAX 1466. TMIN 1147.

LINER CAN 4 TEMP 1-26

	1	2
1	1462.	1199.
2	1453.	1149.
3	1315.	1_ 3.
4	1281.	12,7.
5	1275.	1299.
6		
7	1654.	1282.
8	1371.	1259.
9	1314.	1329.
10	1364.	1453.
11	1213.	1376.
12	1164.	1244.
13	1049.	1137.
CCL.AVE.	1326.4	1282.3

CVERALL AVERAGE 1304.37 TMAX 1654. TMIN 1049.

RCG 6,7100 RPM,T2-77.0,T5-1050,JP-5 FUEL,10-15-63

LINER CAN 4 TEMP 27-36

	1	2
1	1040.	986.
2	1176.	1177.
3	924.	1113.
4	895.	1042.
5	1107.	1132.
COL.AVE.	1028.3	1090.0

CVERALL AVERAGE 1059.17 TMAX 1177. TMIN 895.

CIAPHRAGM TEMPERATURES

	1	2	3	4
1	1558.	1535.	1562.	1437.
2	1391.	1416.	1509.	1495.
3	1547.	1463.	1595.	1525.
4	1677.	1675.	1558.	1516.
5	1629.	1329.	1510.	1503.
6	1616.	1591.	1622.	
7	1436.		1310.	1335.
8	1283.	1324.	1414.	1284.
9	1293.	1281.	1314.	1269.
10	1362.	[illegible]	1237.	1289.
11		1538.	1274.	1313.
12	1296.	1288.	867.	864.
13	981.	970.	721.	699.
COL.AVE.	1422.6	1383.9	1345.9	1294.2

CVERALL AVERAGE 1361.31 TMAX 1677. TMIN 699.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1358.5	1232.3	1296.3

RDG 10,7170 RPM,T2-78.5,T5-1095,JP-5 FUEL,10-15-63

LINER CAN 10 TEMP 1-26

	1	2
1	1606.	C
2	1519.	1220.
3	1391.	1297.
4	1466.	1486.
5	1572.	1311.
6	1258.	1268.
7	1571.	1489.
8	1288.	1323.
9	1419.	1470.
10	1541.	1568.
11	1373.	1392.
12	1671.	1502.
13	1345.	1470.
COL.AVE.	1463.1	1399.6

OVERALL AVERAGE 1432.66 TMAX 1671. TMIN 1220.

LINER CAN 10 TEMP 27-36

	1	2
1	1223.	1192.
2	1405.	1464.
3	1291.	1285.
4	1349.	1196.
5	1345.	1261.
COL.AVE.	1322.7	1279.6

OVERALL AVERAGE 1301.13 TMAX 1464. TMIN 1192.

LINER CAN 4 TEMP 1-26

	1	2
1	1478.	1222.
2	1483.	1190.
3	1311.	1391.
4	1338.	1352.
5	1335.	1328.
6		
7	1687.	1322.
8	1375.	1325.
9	1326.	1324.
10	1357.	1441.
11	1256.	1362.
12	1169.	1225.
13	1353.	1184.
COL.AVE.	1372.4	1305.4

OVERALL AVERAGE 1338.93 TMAX 1687. TMIN 1169.

Fig 4.2-6

RCG 10,7170 RPM,T2-78.5,T5-1095,JP-5 FUEL,10-15-63

LINER CAN 4 TEMP 27-36

	1	2
1	1090.	1034.
2	1280.	1269.
3	971.	1157.
4	923.	1078.
5	1137.	1169.
COL.AVE.	1080.1	1141.4

CVERALL AVERAGE 1110.75 TMAX 1280. TMIN 923.

CIAPHRAGM TEMPERATURES

	1	2	3	4
1	1636.	1581.	1641.	1481.
2	1476.	1475.	1567.	1557.
3	1609.	1481.	1636.	1617.
4	1736.	1760.	1620.	1563.
5	1679.	1345.	1566.	1564.
6	1676.	1652.	1689.	
7	1546.		1363.	1381.
8	1342.	1358.	1513.	1330.
9	1357.	1333.	1303.	1321.
10	1447.	1256.	1291.	1336.
11		1653.	1352.	1355.
12	1345.	1341.	890.	894.
13	1011.	1003.	744.	713.
COL.AVE.	1488.6	1436.6	1398.2	1342.8

CVERALL AVERAGE 1416.17 TMAX 1760. TMIN 713.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1395.1	1271.8	1334.3

Fig. 4.2-7

RDG 14,7246 RPM,T2-79.0,T5-1138,JP-5 FUEL,10-15-63

LINER CAN 10 TEMP 1-26

	1	2
1	1625.	C
2	1534.	1227.
3	1441.	1318.
4	1491.	1524.
5	1610.	1339.
6	1298.	1303.
7	1612.	1525.
8	1325.	1353.
9	1425.	1479.
10	1564.	1593.
11	1389.	1383.
12	1665.	1502.
13	1346.	1475.
COL.AVE.	1486.8	1418.5

OVERALL AVERAGE 1454.01 TMAX 1665. TMIN 1227.

LINER CAN 10 TEMP 27-36

	1	2
1	1252.	1210.
2	1451.	1509.
3	1292.	1271.
4	1377.	1233.
5	1376.	1288.
COL.AVE.	1349.9	1302.3

OVERALL AVERAGE 1326.13 TMAX 1509. TMIN 1210.

LINER CAN 4 TEMP 1-26

	1	2
1	1556.	1277.
2	1531.	1148.
3	1333.	1438.
4	1342.	1357.
5	1334.	1360.
6		
7	1707.	1344.
8	1381.	1334.
9	1385.	1385.
10	1419.	1534.
11	1274.	1432.
12	1221.	1300.
13	1084.	1186.
COL.AVE.	1380.6	1341.3

OVERALL AVERAGE 1360.98 TMAX 1707. TMIN 1084.

RCG 14,7246 RPM,T2-79.0,T5=1138,JP-5 FUEL,10-15-63

LINER CAN 4 TEMP 27-36

	1	2
1	1094.	1038.
2	1240.	1249.
3	993.	1180.
4	945.	1108.
5	1190.	1225.
COL.AVE.	1092.5	1160.1

CVERALL AVERAGE 1126.31   TMAX 1249.   TMIN 945.

CIAPHRAGM TEMPERATURES

	1	2	3	4
1	1676.	1637.	1717.	15[illegible]4.
2	1544.	1519.	1619.	1625.
3	1670.	1560.	1695.	1697.
4	1802.	1819.	1706.	16[illegible]0.
5	1746.	1395.	1635.	16[illegible]4.
6	1726.	1709.	1763.	
7	1602.		1411.	1[illegible]22.
8	1382.	1420.	1559.	1376.
9	1423.	1385.	1231.	1362.
10	1502.	1308.	1333.	13[illegible]6.
11		1693.	1418.	14[illegible]3.
12	1396.	1377.	914.	912.
13	1035.	1025.	761.	731.
COL.AVE.	1542.1	1487.3	1443.4	1391.0

CVERALL AVERAGE 1465.51   TMAX 1819.   TMIN 731.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1417.5	1292.0	1355.6

Fig. [illegible]

RCG 18,7280 RPM,T2-78.0,T5-1160,JP-5 FUEL,10-15-63

LINER CAN 10 TEMP 1-26

	1	2
1	1639.	C
2	1538.	1226.
3	1448.	1331.
4	1505.	1542.
5	1626.	1364.
6	1331.	1317.
7	1616.	1514.
8	1334.	1369.
9	1426.	1487.
10	1563.	1603.
11	1402.	1412.
12	1672.	1501.
13	1178.	1484.
COL.AVE.	1483.1	1429.3

OVERALL AVERAGE 1457.26 TMAX 1672. TMIN 1178.

LINER CAN 10 TEMP 27-36

	1	2
1	1286.	1236.
2	1540.	1556.
3	1298.	1278.
4	1371.	1254.
5	1374.	1283.
COL.AVE.	1373.8	1321.4

OVERALL AVERAGE 1347.60 TMAX 1556. TMIN 1236.

LINER CAN 4 TEMP 1-26

	1	2
1	1541.	1256.
2	1520.	1059.
3	1344.	1441.
4	1365.	1374.
5	1339.	1366.
6		
7	1701.	1362.
8	1389.	1340.
9	1383.	1396.
10	1427.	1536.
11	1298.	1432.
12	1221.	1289.
13	1262.	1201.
COL.AVE.	1399.3	1337.8

OVERALL AVERAGE 1368.52 TMAX 1701. TMIN 1059.

Fig 4.2-3?

RCG 18,7260 RPM,T2-78.0,T5-1160,JP-5 FUEL,10-15-63

LINER CAN 4 TEMP 27-36

	1	2
1	1116.	1051.
2	1261.	1267.
3	1009.	1189.
4	956.	1119.
5	1193.	1237.
COL.AVE.	1107.2	1172.6

CVERALL AVERAGE 1139.91 TMAX 1267. TMIN 956.

CIAPHRAGM TEMPERATURES

	1	2	3	4
1	1705.	1659.	1717.	1541.
2	1582.	1557.	1642.	1629.
3	1689.	1587.	1729.	1766.
4	1833.	1854.	1742.	1661.
5	1776.	1386.	1668.	1651.
6	1749.	1729.	1770.	
7	1615.		1441.	1453.
8	1393.	1441.	1584.	1402.
9	1443.	1419.	1027.	1384.
10	1524.	1329.	1369.	1417.
11		1745.	1437.	1453.
12	1427.	1399.	927.	931.
13	1050.	1045.	769.	739.
COL.AVE.	1565.7	1512.5	1447.9	1418.9

CVERALL AVERAGE 1485.49 TMAX 1854. TMIN 739.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1425.9	1301.3	1364.5

Fig. 4.2-11

RDG 22,7330 RPM,T2-78.5,T5-1187,JP-5 FUEL,10-15-63

LINER CAN 10 TEMP 1-26

	1	2
1	1654.	C
2	1558.	1244.
3	1498.	1359.
4	1534.	1566.
5	1646.	1390.
6	1336.	1329.
7	1651.	1541.
8	1350.	1395.
9	1460.	1515.
10	1577.	1609.
11	1428.	1424.
12	1702.	1501.
13	1190.	1531.
COL.AVE.	1506.6	1450.2

OVERALL AVERAGE 1479.55 TMAX 1702. TMIN 1190.

LINER CAN 10 TEMP 27-36

	1	2
1	1307.	1268.
2	1557.	
3	1322.	1305.
4	1390.	1275.
5	1401.	1325.
COL.AVE.	1395.5	1293.4

OVERALL AVERAGE 1350.12 TMAX 1557. TMIN 1268.

LINER CAN 4 TEMP 1-26

	1	2
1	1575.	1298.
2	1558.	1211.
3	1344.	1462.
4	1387.	1393.
5	1362.	1387.
6		
7	1711.	1381.
8	1426.	1379.
9	1405.	1419.
10	1451.	1567.
11	1331.	1443.
12	1242.	1310.
13	1220.	1221.
COL.AVE.	1417.7	1372.6

OVERALL AVERAGE 1395.28 TMAX 1711. TMIN 1211.

RDG 22,7330 RPM,T2-78.5,T5-1187,JP-5 FUEL,10-1[illegible]-63

LINER CAN 4 TEMP 27-36

	1	2
1	1135.	1066.
2	1272.	1286.
3	1030.	1199.
4	973.	1139.
5	1215.	1261.
COL.AVE.	1125.2	1190.3

OVERALL AVERAGE 1157.77 TMAX 1286. TMIN 973.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1696.	1653.	1760.	1574.
2	1620.	1565.	1656.	1661.
3	1726.	1590.	1754.	1806.
4	1827.	1842.	1783.	1726.
5	1804.	1411.	1712.	1661.
6	1774.	1755.	1807.	
7	1582.		1503.	1475.
8	1426.	1468.	1550.	1435.
9	1476.	1463.	1032.	1403.
10	1500.	1354.	1403.	1456.
11		1699.	1457.	1494.
12	1463.	1440.	940.	947.
13	1060.	1056.	776.	749.
COL.AVE.	1579.6	1524.8	1471.8	1449.0

OVERALL AVERAGE 1505.60 TMAX 1842. TMIN 749.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1445.3	1325.4	1385.4

Fig. 4.2-13

RPG 26 RPM 6890,T2-62.0,T5-920,DIESEL FUEL,10-2?-63

LINER CAN 10 TEMP 1-26

	1	2
1	1426.	C
2	1352.	[illegible]
3	[illegible]	[illegible]
4	1363.	1405.
5	1482.	1205.
6	1167.	1220.
7	1408.	1343.
8	1236.	1185.
9	1261.	1359.
10	1425.	1478.
11	1310.	C
12	1571.	C
13	C	1359.
COL.AVE.	1363.3	1286.0

OVERALL AVERAGE 1328.18 TMAX 1571. TMIN 1124.

LINER CAN 10 TEMP 27-36

	1	2
1	1106.	1072.
2	1328.	
3	1191.	1082.
4	1181.	1070.
5	1168.	1088.
COL.AVE.	1194.9	1078.1

OVERALL AVERAGE 1142.97 TMAX 1328. TMIN 1070.

LINER CAN 4 TEMP 1-26

	1	2
1	1420.	1139.
2	1409.	1114.
3	1161.	1280.
4	1222.	1242.
5	1207.	1209.
6	1090.	
7	1517.	1226.
8	1275.	1138.
9	1187.	1270.
10	1295.	1357.
11	1158.	1305.
12	1125.	1196.
13	1265.	1080.
COL.AVE.	1256.4	1213.0

OVERALL AVERAGE 1235.60 TMAX 1517. TMIN 1080.

Fig. 4.[illegible]-14

RCG 26 RPM 6890,T2-62.0,T5-920,DIESEL FUEL,10-22-63

LINER CAN 4 TEMP 27-36

	1	2
1	971.	930.
2	1116.	1129.
3	892.	1063.
4	849.	997.
5	1049.	1068.
COL.AVE.	975.3	1037.4

CVERALL AVERAGE 1006.32 TMAX 1129. TMIN 849.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1374.	1373.		1283.
2	1280.	1282.	1357.	1361.
3	1372.	1281.	1401.	1440.
4	1501.	1473.		1384.
5	1441.	1195.	1352.	1358.
6	1444.	1434.	1418.	1417.
7	1225.	1117.	1158.	1159.
8	1142.	1179.	1219.	1128.
9	1141.	1139.	1149.	1120.
10	1177.	1051.	1108.	1132.
11		1307.		1153.
12	1140.	1142.	784.	780.
13	867.	855.	666.	638.
COL.AVE.	1258.7	217.6	1161.2	1181.1

CVERALL AVERAGE 1206.25 TMAX 1501. TMIN 638.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1274.4	1170.1	1219.1

[illegible]

RDG 30,RPM 7114,T2-65.5,T5-1050,DIESEL FUEL,10-22-63

LINER CAN 10 TEMP 1-26

	1	2
1	1563.	C
2	1432.	1200.
3	1342.	1285.
4	1443.	1484.
5	1555.	1317.
6	1251.	1314.
7	1597.	1528.
8	1325.	1306.
9	1395.	1453.
10	1520.	1542.
11	1381.	C
12	1629.	C
13	C	1445.
COL.AVE.	1452.8	1387.6

OVERALL AVERAGE 1423.17 TMAX 1629. TMIN 1200.

LINER CAN 10 TEMP 27-36

	1	2
1	1194.	1137.
2	1366.	
3	1268.	1209.
4	1338.	1179.
5	1316.	1252.
COL.AVE.	1296.6	1194.3

OVERALL AVERAGE 1251.17 TMAX 1366. TMIN 1137.

LINER CAN 4 TEMP 1-26

	1	2
1	1502.	1233.
2	1477.	1160.
3		1399.
4	1333.	1337.
5	1283.	1346.
6	1226.	
7	1641.	1345.
8	1336.	1279.
9	1284.	1328.
10	1349.	1422.
11	1258.	1366.
12	1179.	1248.
13	1307.	1177.
COL.AVE.	1348.2	1303.3

OVERALL AVERAGE 1325.71 TMAX 1641. TMIN 1160.

RDG 30,RPM 7114,T2-65.5,T5-1050,DIESEL FUEL,10-22-63

LINER CAN 4 TEMP 27-36

	1	2
1	1074.	1015.
2	1247.	1247.
3	979.	1151.
4	925.	1071.
5	1130.	1175.
COL.AVE.	1070.3	1132.0

CVERALL AVERAGE 1101.15 TMAX 1247. TMIN 925.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1532.	1498.		1428.
2	1429.	1426.	1567.	1517.
3	1536.	1413.	1607.	1674.
4	1655.	1667.		1572.
5	1607.	1309.	1519.	1510.
6	1683.7	1615.	1601.	1577.
7	1432.	1260.	1298.	1360.
8	1308.	1297.	1415.	1252.
9	1291.	1285.	1337.	1269.
10	1356.	1192.	1243.	1302.
11	1301.	1542.		1313.
12	1310.	1299.	857.	852.
13	951.	930.	726.	692.
COL.AVE.	1414.7	1364.2	1317.2	1332.3

CVERALL AVERAGE 1359.53 TMAX 1683. TMIN 692.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1373.2	1259.7	1313.8

RDG 34,RPM 7195,T2-68.0,T5-1100,DIESEL FUEL,10-22-63

LINER CAN 10 TEMP 1=26

	1	2
1	1602.	C
2	1461.	1220.
[illegible]	[illegible]	[illegible]
4	1476.	1503.
5	1573.	1374.
6	1299.	1357.
7	1692.	1600.
8	1351.	1327.
9	1439.	1487.
10	1541.	1569.
11	1403.	C
12	1679.	C
13	C	1474.
COL.AVE.	1487.9	1424.7

OVERALL AVERAGE 1459.16 TMAX 1692. TMIN 1220.

LINER CAN 10 TEMP 27-36

	1	2
1	1217.	1155.
2	1359.	
3	1294.	1235.
4	1343.	1219.
5	1393.	1329.
COL.AVE.	1321.5	1234.6

OVERALL AVERAGE 1282.90 TMAX 1393. TMIN 1155.

LINER CAN 4 TEMP 1-26

	1	2
1	1514.	1250.
2	1495.	1183.
3		1433.
4	1368.	1372.
5	1314.	1384.
6	1260.	
7	1706.	1360.
8	1332.	1338.
9	1332.	1359.
10	1388.	1469.
11	1299.	1451.
12	1207.	1294.
13	1213.	1205.
COL.AVE.	1369.1	1341.7

OVERALL AVERAGE 1355.37 TMAX 1706. TMIN 1183.

RCG 34,RPM 7195,T2-68.0,T5-1100,DIESEL FUEL,10-22-63

LINER CAN 4 TEMP 27-36

	1	2
1	1113.	1040.
2	1277.	1279.
3	998.	1173.
4	956.	1101.
5	1144.	1198.
COL.AVE.	1097.9	1158.3

CVERALL AVERAGE 1128.10 TMAX 1279. TMIN 956.

CIAPHRAGM TEMPERATURES

	1	2	3	4
1	1567.	1536.		1471.
2	1488.	1476.	1585.	1558.
3	1575.	1433.	1653.	1744.
4	1711.	1724.		1630.
5	1663.	1355.	1582.	1582.
6	1702.	1666.	1668.	1639.
7	1491.	1297.	1353.	1393.
8	1338.	1345.	1467.	1307.
9	1340.	1344.	1374.	1303.
10	1409.	1245.	1299.	1347.
11	1337.	1606.		1374.
12	1359.	1341.	879.	882.
13	976.	962.	742.	707.
COL.AVE.	1458.2	1410.0	1360.3	1330.0

CVERALL AVERAGE 1404.69 TMAX 1744. TMIN 707.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1408.0	1288.5	1345.5

Fig. 4.2-19

RDG 38,RPM 7280,T2-69.0,T5-1135,DIESEL FUEL,10-22-63

LINER CAN 10 TEMP 1-26

	1	2
1	1621.	C
2	1480.	1229.
3	1345.	1353.
4	1506.	1536.
5	1588.	1401.
6	1347.	1380.
7	1721.	1589.
8	1374.	1405.
9	1548.	1516.
10	1539.	1515.
11	1452.	C
12	1668.	C
13	C	1523.
COL.AVE.	1515.8	1444.8

OVERALL AVERAGE 1483.53 TMAX 1721. TMIN 1229.

LINER CAN 10 TEMP 27-36

	1	2
1	1310.	1226.
2	1599.	
3	1292.	1249.
4	1363.	1257.
5	1395.	1304.
COL.AVE.	1391.8	1259.1

OVERALL AVERAGE 1332.84 TMAX 1599. TMIN 1226.

LINER CAN 4 TEMP 1-26

	1	2
1	1540.	1262.
2	1524.	1179.
3		1437.
4	1386.	1400.
5	1338.	1376.
6	1279.	
7	1716.	1381.
8	1334.	1404.
9	1379.	1387.
10	1421.	1503.
11	1333.	
12	1216.	1273.
13	1212.	1237.
COL.AVE.	1390.0	1346.8

OVERALL AVERAGE 1370.33 TMAX 1716. TMIN 1179.

Fig. [illegible].2-[illegible]

RCG 38,RPM 7280,T2-69.0,T5-1135,DIESEL FUEL,10-22-63

LINER CAN 4 TEMP 27-36

	1	2
1	1159.	1069.
2	1345.	1325.
3	1024.	1192.
4	990.	1149.
5	1175.	1231.
COL.AVE.	1138.5	1193.3

OVERALL AVERAGE 1165.90 TMAX 1345. TMIN 990.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1621.	1581.		1516.
2	1545.	1522.	1653.	1640.
3	1633.	1503.	1694.	1790.
4	1779.	1789.		1680.
5	1701.	1393.	1650.	1635.
6	1792.	1751.	1705.	1677.
7	1547.	1329.	1416.	1402.
8	1386.	1399.	1529.	1344.
9	1383.	1398.	1401.	1343.
10	1464.	1279.	1350.	1391.
11	1471.	1668.		1426.
12	1389.	1378.	899.	906.
13	1001.	990.	759.	724.
COL.AVE.	1516.4	1460.1	1405.8	1421.3

OVERALL AVERAGE 1453.68 TMAX 1792. TMIN 724.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1439.8	1308.4	1372.0

Fig. 412-21

RCG 42,RPM 7295,T2-70.0,T5-1160,DIESEL FUEL,10-22-63

LINER CAN 10 TEMP 1-26

	1	2
1	1637.	C
2	1503.	1226.
3	1310.	1392.
4	1541.	1508.
5	1576.	1455.
6	1382.	1393.
7	1799.	1545.
8	1389.	1376.
9	1514.	1559.
10	1589.	1593.
11	1444.	C
12	1710.	C
13	C	1529.
COL.AVE.	1532.8	1457.6

OVERALL AVERAGE 1498.66 TMAX 1799. TMIN 1226.

LINER CAN 10 TEMP 27-36

	1	2
1	1277.	1194.
2	1438.	
3	1315.	1275.
4	1370.	1251.
5	1443.	1368.
COL.AVE.	1368.7	1271.9

OVERALL AVERAGE 1325.71 TMAX 1443. TMIN 1194.

LINER CAN 4 TEMP 1-26

	1	2
1	1552.	1305.
2	1544.	1215.
3		1468.
4	1383.	1392.
5	1353.	1376.
6	1279.	
7	1734.	1394.
8	1381.	1392.
9	1363.	1376.
10	1410.	1517.
11	1280.	
12	1197.	1280.
13	1292.	1208.
COL.AVE.	1397.4	1356.7

OVERALL AVERAGE 1377.92 TMAX 1734. TMIN 1197.

Fig. 4.2-22

RDG 42,RPM 7295,T2-70.0,T5-1160,DIESEL FUEL,10-22-63

LINER CAN 4 TEMP 27-36

	1	2
1	1140.	1038.
2	1270.	1266.
3	1036.	1265.
4	993.	1126.
5	1197.	1256.
COL.AVE.	1127.4	1178.1

CVERALL AVERAGE 1152.74 TMAX 1270. TMIN 993.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1653.	1585.		1528.
2	1553.	1532.	1650.	1649.
3	1643.	1466.	1744.	1829.
4	1786.	1808.		1707.
5	1744.	1415.	1669.	1646.
6	1802.	1765.	1724.	1650.
7	1570.	1366.	1430.	1416.
8	1426.	1427.	1562.	1364.
9	1401.	1411.	1429.	1375.
10	1494.	1304.	1363.	1431.
11	1451.	1715.		1443.
12	1425.	1396.	907.	911.
13	1004.	993.	766.	732.
COL.AVE.	1535.0	1475.8	1424.5	1437.2

CVERALL AVERAGE 1470.80 TMAX 1829. TMIN 732.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1448.4	1309.7	1376.9

RDG 45,RPM 7346,T2-73.0,T5-1185,DIESEL FUEL,10-22-63

LINER CAN 10 TEMP 1-26

	1	2
1	1647.	C
2	1500.	1239.
3	1311.	1401.
4	1565.	1501.
5	1561.	1436.
6	1401.	1374.
7	1691.	1606.
8	1377.	1378.
9	1545.	1575.
10	1616.	1634.
11	1446.	C
12	1729.	C
13	C	1603.
COL.AVE.	1532.4	1480.0

OVERALL AVERAGE 1508.56 TMAX 1729. TMIN 1239.

LINER CAN 10 TEMP 27-36

	1	2
1	1295.	
2	1476.	
3	1354.	1293.
4	1410.	1273.
5	1436.	1376.
COL.AVE.	1394.3	1314.2

OVERALL AVERAGE 1364.26 TMAX 1476. TMIN 1273.

LINER CAN 4 TEMP 1-26

	1	2
1	1545.	1316.
2	1576.	1219.
3		1493.
4	1427.	1418.
5		1398.
6	1317.	
7	1733.	1404.
8	1420.	1449.
9	1394.	1395.
10	1432.	1547.
11	1361.	
12	1242.	1297.
13	1090.	1260.
COL.AVE.	1412.6	1381.4

OVERALL AVERAGE 1397.00 TMAX 1733. TMIN 1090.

Fig. 4.2-24

RCG 45,RPM 7346,T2-73.0,T5-1185,DIESEL FUEL,10-22-63

LINER CAN 4 TEMP 27-36

	1	2
1	1196.	1078.
2	1337.	1318.
3	1057.	1231.
4	1028.	1157.
5	1195.	1260.
COL.AVE.	1162.8	1208.7

OVERALL AVERAGE 1185.73 TMAX 1337. TMIN 1028.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1637.	1595.		1568.
2	1600.	1547.	1644.	1670.
3	1688.	1501.		
4	1799.	1806.		
5	1749.	1452.	1715.	1666.
6	1803.	1756.	1753.	1683.
7	1582.	1387.	1492.	1438.
8	1464.	1474.	1576.	1428.
9	1444.	1460.	1431.	1413.
10	1517.	1333.	1400.	1436.
11	1421.	1731.		1491.
12	1434.	1418.	927.	934.
13	1025.	1017.	778.	746.
COL.AVE.	1551.3	1498.2	1413.1	1406.7

OVERALL AVERAGE 1474.69 TMAX 1806. TMIN 746.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1470.1	1331.0	1398.3

Fig. 4 (...)

RDG 49,RPM 7415,T2-74.0,T5-1212,DIESEL FUEL,10-22-63

LINER CAN 10 TEMP 1-26

	1	2
1	1642.	C
2	1508.	1220.
3	1255.	1435.
4	1620.	1452.
5	1441.	1561.
6	1448.	1435.
7	1794.	1610.
8	1396.	1426.
9	1592.	1583.
10	1633.	1658.
11	1497.	C
12	1761.	C
13	C	1618.
COL.AVE.	1549.0	1500.0

OVERALL AVERAGE 1526.72   TMAX 1794.   TMIN 1220.

LINER CAN 10 TEMP 27-36

	1	2
1	1326.	
2	1485.	
3	1374.	1331.
4	1380.	1299.
5	1460.	1410.
COL.AVE.	1405.0	1346.6

OVERALL AVERAGE 1383.11   TMAX 1485.   TMIN 1299.

LINER CAN 4 TEMP 1-26

	1	2
1	1538.	1346.
2	1609.	1239.
3		1532.
4	1467.	1449.
5		1438.
6	1382.	
7	1755.	1413.
8	1390.	1507.
9	1471.	1462.
10	1478.	1576.
11	1372.	
12	1250.	1317.
13	1105.	1261.
COL.AVE.	1438.0	1412.9

OVERALL AVERAGE 1425.46   TMAX 1755.   TMIN 1105.

Fig. 4.2-26

RCG 49,RPM 7415,T2=74.0,T5-1212,DIESEL FUEL,10-22-63

LINER CAN 4 TEMP 27-36

	1	2
1	1200.	1086.
2	1339.	1327.
3	1082.	1255.
4	1045.	1169.
5	1208.	1282.
COL.AVE.	1174.8	1223.6

OVERALL AVERAGE 1199.19 TMAX 1339. TMIN 1045.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1670.	1618.		1591.
2	1636.	1592.	1674.	1685.
3	1717.	1529.		
4	1827.	1830.		
5	1780.	1471.	1751.	1709.
6	1817.	1783.	1763.	1711.
7	1608.	1409.	1503.	1425.
8	1498.	1511.	1612.	1439.
9	1466.	1483.	1426.	1452.
10	1554.	1358.	1432.	1467.
11	1444.	1779.		1510.
12	1448.	1453.	943.	950.
13	1038.	1035.	788.	759.
COL.AVE.	1577.4	1527.1	1432.3	1427.1

OVERALL AVERAGE 1498.85 TMAX 1830. TMIN 759.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1488.4	1354.8	1419.4

RCG 53,RPM 7140,T2-78.5,T5-1050,D.F.-1ST 10 HR,10-22-63

LINER CAN 10 TEMP 1-26

	1	2
1	1572.	C
2	1458.	1177.
3	1284.	1322.
4	1522.	1452.
5	1551.	1451.
6	1301.	1375.
7	1651.	1576.
8	1312.	1318.
9	1507.	1530.
10	1545.	1594.
11	1415.	C
12	1669.	C
13	C	1563.
COL.AVE.	1482.5	1436.0

OVERALL AVERAGE 1461.37 TMAX 1669. TMIN 1177.

LINER CAN 10 TEMP 27-36

	1	2
1	1244.	
2	1453.	
3	1326.	1202.
4	1404.	1212.
5	1359.	1304.
COL.AVE.	1357.3	1239.2

OVERALL AVERAGE 1313.02 TMAX 1453. TMIN 1202.

LINER CAN 4 TEMP 1-26

	1	2
1	1491.	1261.
2	1505.	1122.
3		1382.
4	1331.	1330.
5		1273.
6	1195.	
7	1667.	1307.
8	1379.	1323.
9	1337.	1376.
10	1414.	1560.
11	1214.	
12	1179.	1255.
13	1259.	1154.
COL.AVE.	1361.0	1304.0

OVERALL AVERAGE 1332.50 TMAX 1667. TMIN 1122.

RCG 53,RPM 7140,T2-78.5,TS-1050,C.F.-1ST 1C HR,10-22-63

LINER CAN 4 TEMP 27-36

	1	2
1	1076.	992.
2	1198.	1198.
3	1012.	1223.
4	978.	1086.
5	1119.	1165.
COL.AVE.	1076.7	1136.9

CVERALL AVERAGE 1106.78 TMAX 1223. TMIN 978.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1517.	1464.		1408.
2	1447.	1422.	1539.	1503.
3	1501.	1354.		
4	1643.	1664.		
5	1634.	1344.	1547.	1513.
6	1656.	1580.	1545.	1525.
7	1463.	1262.	1295.	1347.
8	1338.	1295.	1448.	1260.
9	1287.	1272.	1305.	1296.
10	1396.	1189.	1240.	1365.
11	1299.	1593.		1305.
12	1292.	1299.	865.	867.
13	953.	937.	740.	707.
COL.AVE.	1417.3	1359.7	1280.6	1281.5

CVERALL AVERAGE 1341.81 TMAX 1664. TMIN 707.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1421.8	1262.0	1339.3

RCG 82,RPM 7270,T2-68.0,T5-1160,DF-2ND 10 HR,10-23-63

LINER CAN 10 TEMP 1-26

	1	2
1	1579.	C
2	C	1153.
3	C	1251.
4	1505.	1527.
5	C	1590.
6	C	1269.
7	C	1181.
8	1368.	1532.
9	1758.	1550.
10	1351.	1270.
11	1444.	C
12	1657.	982.
13	1383.	1518.
COL.AVE.	1505.8	1347.6

OVERALL AVERAGE 1414.22 TMAX 1758. TMIN 982.

LINER CAN 10 TEMP 27-36

	1	2
1	1247.	
2	1626.	
3	1203.	1107.
4	1259.	1196.
5	1359.	1227.
COL.AVE.	1338.8	1177.0

OVERALL AVERAGE 1278.12 TMAX 1626. TMIN 1107.

LINER CAN 4 TEMP 1-26

	1	2
1	1388.	1222.
2	1504.	1133.
3		1407.
4	1431.	1395.
5		1372.
6	1403.	
7		1159.
8	1188.	1479.
9	1469.	1439.
10	1465.	1420.
11	1285.	
12	1154.	1288.
13	1087.	1145.
COL.AVE.	1337.6	1314.5

OVERALL AVERAGE 1325.46 TMAX 1504. TMIN 1087.

Fig. [illegible]

RCG 82,RPM 7270,T2-68.0,T5-1160,CF-2ND 10 HR,10-23-63

LINER CAN 4 TEMP 27-36

	1	2
1	1129.	981.
2	1188.	1175.
3	1036.	1135.
4	985.	1116.
5	1143.	1216.
COL.AVE.	1096.4	1124.7

CVERALL AVERAGE 1110.53 TMAX 1216. TMIN 981.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1732.	1565.		1507.
2	1531.	1538.	1667.	1677.
3	1671.	1516.		1096.
4	1748.	1818.		
5	1719.	1631.	1633.	1614.
6	1832.	1779.		1696.
7	1531.	1328.	1379.	1331.
8	1350.	1418.	1512.	1317.
9	1368.	1383.	1328.	1343.
10	1434.	1271.	1342.	1357.
11	1439.	1763.		1425.
12	1327.	1342.	912.	9C5.
13	992.	[illegible]81.	765.	731.
COL.AVE.	1513.5	148[illegible].3	1317.4	1333.2

CVERALL AVERAGE 1424.97 TMAX 1832. TMIN 731.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1373.9	1256.1	1310.9

RDG 86,RPM 7270,T2-70.0,T5-1165,DF-2ND 10 HR,10-23-63

LINER CAN 10 TEMP 1-26

	1	2
1	1518.	C
2	C	1204.
3	C	1270.
4	1788.	1012.
5	C	1620.
6	C	999.
7	C	1100.
8	1011.	1478.
9	1514.	1600.
10	1302.	906.
11	1437.	C
12	1688.	940.
13	1299.	1512.
COL.AVE.	1444.8	1240.2

OVERALL AVERAGE 1326.37 THAX 1788. THIN 906.

LINER CAN 10 TEMP 27-36

	1	2
1	1240.	
2	1539.	
3	1158.	1082.
4		1223.
5	1353.	1241.
COL.AVE.	1322.6	1181.9

OVERALL AVERAGE 1262.30 THAX 1539. THIN 1082.

LINER CAN 4 TEMP 1-26

	1	2
1	1406.	1233.
2	1508.	1116.
3		1351.
4	1393.	1385.
5		1319.
6	1295.	
7		1169.
8	1281.	1458.
9	1421.	1455.
10	1428.	1417.
11	1312.	
12	1128.	1265.
13	1175.	1144.
COL.AVE.	1334.8	1301.3

OVERALL AVERAGE 1317.27 THAX 1508. THIN 1116.

Fig. 4.2-32

RDG 86,RPM 7270,T2-70.0,T5-1165,CF-2ND 10 HR:10-23-63

LINER CAN 4 TEMP 27-36

	1	2
1	1130.	976.
2	1197.	1168.
3	1025.	1170.
4	1005.	1143.
5		1200.
CCL.AVE.	1089.5	1131.7

CVERALL AVERAGE 1112.94 TMAX 1200. TMIN 976.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1754.	1571.		1524.
2	1547.	1531.	1628.	1623.
3	1687.	1558.		933.
4	1752.	1876.		
5	1681.	1633.	1636.	1617.
6	1729.	1731.		1727.
7	1549.	1284.	1383.	1258.
8	1376.	1380.	1528.	1322.
9	1337.	1389.	1284.	1352.
10	1450.	1250.	1344.	1316.
11	1531.	1754.		1424.
12	1278.	1351.	911.	907.
13	992.	986.	772.	733.
CCL.AVE.	1512.6	1484.3	1310.6	1310.9

CVERALL AVERAGE 1416.87 TMAX 1876. TMIN 733.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1309.1	1256.0	1280.6

Fig. 4.7-53

RDG [illegible] RPM 7072,T2-73.5,T5-1050,CF-2ND 10 HR,10-23-63

LINER CAN 10 TEMP 1-26

	1	2
1	1508.	C
2	C	1152.
3	C	1199.
4	1469.	1542.
5	C	1511.
6	C	1478.
7	C	1367.
8	1478.	1401.
9	C	1574.
10	1564.	1453.
11	1393.	C
12	1660.	C
13	1389.	1453.
COL.AVE.	1494.4	1413.2

OVERALL AVERAGE 1446.65 TMAX 1660. TMIN 1152.

LINER CAN 10 TEMP 27-36

	1	2
1	1159.	
2	1384.	
3	1156.	1052.
4		1131.
5	1336.	1203.
COL.AVE.	1259.0	1129.0

OVERALL AVERAGE 1203.27 TMAX 1384. TMIN 1052.

LINER CAN 4 TEMP 1-26

	1	2
1	1357.	1172.
2	1455.	1024.
3		1342.
4	1378.	1359.
5		1356.
6	1326.	
7		1163.
8	1171.	1413.
9	1383.	1437.
10	1464.	1501.
11	1191.	
12	1100.	1221.
13	1408.	1077.
COL.AVE.	1323.3	1278.7

OVERALL AVERAGE 1299.95 TMAX 1501. TMIN 1024.

RDG 89,RPM 7072,T2-73.5,T5-1050,DF-2ND 10 HR,10-23-63

LINER CAN 4 TEMP 27-36

	1	2
1	1039.	916.
2	1072.	1070.
3	984.	1082.
4	932..	1071.
5		1160.
COL.AVE.	1006.6	1060.0

OVERALL AVERAGE 1036.27 TMAX 1160. TMIN 916.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1589.	1445.		1377.
2	1429.	1405.	1416.	1505.
3	1550.	1397.		
4	1598.	1692.		
5	1567.	1483.	1505.	1463.
6	1573.	1591.		1531.
7	1419.	1218.	1271.	1148.
8	1242.	1282.	1381.	1203.
9	1235.	1268.	1163.	1233.
10	1326.	1151.	1221.	1183.
11	1249.	1571.		1289.
12	1166.	1238.	856.	852.
13	939.	934.	726.	694.
COL.AVE.	1375.7	1359.6	1192.6	1225.4

OVERALL AVERAGE 1301.76 TMAX 1692. TMIN 694.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1375.7	1220.8	1289.7

FIG. 4.2-35

RDG 103,RPM 7070,T2-79.5,T5-1051,DF-2ND 10 HR,10-23-63

LINER CAN 10 TEMP 1-26

	1	2
1	1549.	C
2	C	1164.
3	C	1188.
4	1645.	1620.
5	C	1550.
6	C	1472.
7	C	1127.
8	1485.	1396.
9	C	1644.
10	1729.	C
11	1389.	C
12	1719.	C
13	C	1422.
COL.AVE.	1586.0	1398.0

OVERALL AVERAGE 1473.21   TMAX 1729.   TMIN 1127.

LINER CAN 10 TEMP 27-36

	1	2
1	1149.	
2	1262.	
3	1139.	1061.
4		1136.
5	1325.	1216.
COL.AVE.	1218.8	1137.6

OVERALL AVERAGE 1184.00   TMAX 1325.   TMIN 1061.

LINER CAN 4 TEMP 1-26

	1	2
1	1346.	1204.
2	1430.	1012.
3		1316.
4	1570.	1652.
5		1312.
6	1456.	
7		989.
8	1403.	1416.
9	1376.	1538.
10	1589.	1545.
11	1143.	
12	1105.	1255.
13	1290.	1078.
COL.AVE.	1371.0	1301.7

OVERALL AVERAGE 1334.68   TMAX 1652.   TMIN 989.

Fig. 4.2-3

ROG 103,RPM 7070,T2-79.5,T5-1051,DF-2ND 10 HR,10-23-63

LINER CAN 4 TEMP 27-36

	1	2
1	1026.	917.
2	1067.	1061.
3	994.	1097.
4	943.	1065.
5		1181.
COL.AVE.	1007.7	1064.4

OVERALL AVERAGE 1039.18 TMAX 1181. TMIN 917.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1653.	1460.		1347.
2	1396.	1327.	1231.	1505.
3	1545.	1375.		
4	1648.	1784.		
5	1564.	1473.	1498.	1400.
6	1586.	1598.		1527.
7	1489.	1224.	1290.	1216.
8	1227.	1267.	1461.	1190.
9	1241.	1246.	1207.	1207.
10	1373.	1147.	1190.	1203.
11	1258.	1678.		1280.
12	1185.	1216.	856.	862.
13	964.	953.	733.	696.
COL.AVE.	1394.6	1365.3	1183.3	1221.2

OVERALL AVERAGE 1306.21 TMAX 1784. TMIN 696.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1381.2	1246.0	1303.2

Fig. L.2 37

RCG 106,RPM 6855,T2-79.0,T5-917.5,CF-2ND 10 HR,10-23-63

LINER CAN 10 TEMP 1-26

	1	2
1	1370.	C
2	C	1136.
3	C	1099.
4	1608.	1531.
5	C	1442.
6	C	1433.
7	C	1149.
8	1353.	1308.
9	C	1569.
10	1661.	C
11	1313.	C
12	1616.	C
13	C	1318.
COL.AVE.	1486.9	1331.8

CVERALL AVERAGE 1393.83 TMAX 1661. TMIN 1099.

LINER CAN 10 TEMP 27-36

	1	2
1	1043.	
2	1117.	
3	1022.	951.
4		1012.
5	1197.	1072.
COL.AVE.	1094.9	1012.0

CVERALL AVERAGE 1059.37 TMAX 1197. TMIN 951.

LINER CAN 4 TEMP 1-26

	1	2
1	1271.	1118.
2	1361.	949.
3		1193.
4	1508.	1628.
5		1183.
6	1351.	
7		1214.
8	1351.	1354.
9	1329.	1486.
10	1530.	1465.
11	1087.	
12	1012.	1161.
13	1012.	1038.
CCL.AVE.	1281.2	1253.6

OVERALL AVERAGE 1266.75 TMAX 1628. TMIN 949.

Fig. 4.2-36

RDG 106,RPM 6855,T2-79.0,T5-917.5,DF-2ND 10 HR,10-23-63

LINER CAN 4 TEMP 27-36

	1	2
1	980.	877.
2	1055.	1023.
3	923.	[illegible]
4	894.	1027.
5		1060.
COL.AVE.	963.1	1006.7

OVERALL AVERAGE 987.34 TMAX 1060. TMIN 877.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1437.	1294.		1239.
2	1240.	1166.	1147.	1372.
3	1372.	1252.		
4	1450.	1537.		
5	1373.	1340.	1332.	1229.
6	1396.	1441.		1366.
7	1329.	1044.	1186.	1057.
8	1086.	1132.	1289.	1073.
9	1061.	1142.	1050.	1072.
10	1206.	1002.	1080.	1045.
11	1179.	1448.		1154.
12	1034.	1072.	786.	793.
13	879.	872.	680.	643.
COL.AVE.	1234.1	1211.1	1068.6	1095.0

OVERALL AVERAGE 1164.04 TMAX 1537. TMIN 643.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1287.4	1182.9	1227.1

Fig. 4.2-3

RDG 120;RPM 6850;T2-68.0;T5-919.5;DF-2ND 10 HR;10-23-63

LINER CAN 10 TEMP 1-26

	1	2
1	1280.	C
2	C	1140.
3	C	1027.
4	1550.	1478.
5	C	1423.
6	C	1042.
7	C	1014.
8	1248.	1331.
9	C	1613.
10	1478.	C
11	1200.	C
12	1510.	C
13	C	1208.
COL.AVE.	1377.9	1253.0

OVERALL AVERAGE 1302.98 TMAX 1613. TMIN 1014.

LINER CAN 10 TEMP 27-36

	1	2
1	1010.	
2	1084.	
3	954.	899.
4		957.
5	1088.	1013.
COL.AVE.	1034.1	956.4

OVERALL AVERAGE 1000.84 TMAX 1088. TMIN 899.

LINER CAN 4 TEMP 1-26

	1	2
1	1229.	1104.
2	1253.	
3		1241.
4	1652.	1561.
5		1217.
6		
7		946.
8	1323.	1293.
9	1436.	1518.
10	1611.	1514.
11	1021.	
12	1047.	1139.
13	1340.	1009.
COL.AVE.	1323.6	1254.2

OVERALL AVERAGE 1287.08 TMAX 1652. TMIN 946.

RDG 120,RPM 6850,T2-68.0,T5-919.5,DF-2ND 10 HR,10-23-63

LINER CAN 4 TEMP 27-36

	1	2
1	948.	851.
2	981.	979.
3	913.	1010.
4	862.	979.
5		1065.
COL.AVE.	925.9	976.8

OVERALL AVERAGE 954.22 TMAX 1065. TMIN 851.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1410.	1280.		1244.
2	1227.	1190.	1118.	1339.
3	1394.	1294.		
4	1425.	1515.		
5	1397.	1358.	1326.	1257.
6	1360.	1421.		1428.
7	1279.	1067.	1187.	1024.
8	1068.	1126.	1245.	1078.
9	1076.	1158.	1024.	1076.
10	1165.	1004.	1107.	1037.
11	1142.			1177.
12	1013.	1071.	778.	783.
13	870.	866.	670.	635.
COL.AVE.	1217.5	1195.9	1057.0	1098.0

OVERALL AVERAGE 1152.55 TMAX 1515. TMIN 635.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1206.8	1180.1	1191.9

Fig. 4.2-41

RDG 123,RPM 7275,T2-77.0,T5-1162,D.F.-3RD 10 HR,10-25-63

LINER CAN 10 TEMP 1-26

	1	2
1	C	C
2	C	1262.
3	C	1269.
4	1677.	1057.
5	C	1652.
6	C	C
7	C	1060.
8	C	1490.
9	C	1807.
10	1581.	C
11	1346.	C
12	1751.	C
13	C	1528.
COL.AVE.	1588.9	1390.8

OVERALL AVERAGE 1456.82 TMAX 1807. TMIN 1057.

LINER CAN 10 TEMP 27-36

	1	2
1	1297.	
2	1480.	
3	1101.	1070.
4		1240.
5	1465.	1258.
COL.AVE.	1336.0	1189.3

OVERALL AVERAGE 1273.11 TMAX 1480. TMIN 1070.

LINER CAN 4 TEMP 1-26

	1	2
1	1455.	1093.
2	1370.	
3		1430.
4	1742.	1405.
5		1365.
6		
7		1014.
8	1050.	1409.
9	1630.	1527.
10	1676.	1490.
11	1155.	
12	1145.	
13		1088.
COL.AVE.	1403.1	1313.4

OVERALL AVERAGE 1355.58 TMAX 1742. TMIN 1014.

Fig. 4.2-42

RDG 12[illegible],RPM 7275,T2-77.0,T5-1162,D.F.-3RD 10 HR,10-25-63

LINER CAN 4 TEMP 27-36

	1	2
1	1082.	953.
2	1104.	1097.
3	1050.	1128.
4	976.	1130.
5		1217.
COL.AVE.	1053.1	1104.9

OVERALL AVERAGE 1081.88 TMAX 1217. TMIN 953.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1613.	1505.		1449.
2	1489.	1507.		1577.
3	1648.	1528.		
4	1702.			
5	1711.	1608.	1614.	1583.
6	1617.	1631.		1714.
7	1408.	1312.	1388.	1265.
8	1411.	1377.	1409.	1328.
9	1344.	1380.	1255.	
10		1240.	1343.	
11				1415.
12	1244.	1387.	909.	907.
13	1003.	994.	768.	734.
COL.AVE.	1471.9	1410.9	1240.7	1330.4

OVERALL AVERAGE 1378.13 TMAX 1714. TMIN 734.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1389.1	1260.8	1315.0

RDG 127,RPM 7255,T2-78.0,T5-1158,D.F.-3RD 10 HR,10-25-63

LINER CAN 10 TEMP 1-26

	1	2
1	C	C
2	C	1221.
3	C	1426.
4	1721.	964.
5	C	1695.
6	C	C
7	C	1051.
8	C	1508.
9	C	1857.
10	1463.	C
11	1341.	C
12	1735.	C
13	C	1453.
COL.AVE.	1564.7	1397.0

OVERALL AVERAGE 1452.93 TMAX 1857. TMIN 964.

LINER CAN 10 TEMP 27-36

	1	2
1	1218.	
2	1314.	
3	1089.	1057.
4		1238.
5	1683.	1350.
COL.AVE.	1326.2	1215.2

OVERALL AVERAGE 1278.67 TMAX 1683. TMIN 1057.

LINER CAN 4 TEMP 1-26

	1	2
1	1429.	1090.
2	1361.	
3		1454.
4	1769.	1470.
5		1377.
6		
7		1061.
8	1109.	1415.
9	1563.	1550.
10	1658.	1523.
11	1132.	
12	1146.	
13		1085.
COL.AVE.	1396.2	1336.3

OVERALL AVERAGE 1364.48 TMAX 1769. TMIN 1061.

Figure 4.2-44

RDG 127,RPM 7255,T2-78.0,T5-1158,D.F.-3RD 10 HR,1C-25-63

LINER CAN 4 TEMP 27-36

	1	2
1	1077.	946.
2	1080.	1080.
3	1038.	1112.
4	968.	1126.
5		1230.
COL.AVE.	1040.9	1099.0

OVERALL AVERAGE 1073.19 TMAX 1230. TMIN 946.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1563.	1494.		1435.
2	1513.	1505.		1621.
3	1616.	1536.		
4	1715.			
5	1750.	1592.	1638.	1569.
6	1643.	1646.		1704.
7	1402.	1319.	1360.	1266.
8	1388.	1403.	1433.	1299.
9	1353.	1346.	1270.	
10		1237.	1299.	
11				1366.
12	1258.	1367.	907.	907.
13	1004.	993.	764.	733.
COL.AVE.	1482.2	1403.5	1239.0	1322.3

OVERALL AVERAGE 1376.77 TMAX 1750. TMIN 733.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1388.7	1263.6	1316.5

Fig. 4-5.45

RCG 133,RPM 7110,T2-79.0,T5-105C,C.F.-3RD 10 HR,10-25-63

LINER CAN 10 TEMP 1-26

	1	2
1	C	C
2	C	990.
3	C	1346.
4	1618.	1161.
5	C	1531.
6	C	C
7	C	1121.
8	C	1427.
9	C	1736.
10	1512.	C
11	1290.	C
12	1684.	C
13	C	1335.
COL.AVE.	1526.1	1330.8

CVERALL AVERAGE 1395.91 TMAX 1736. TMIN 990.

LINER CAN 10 TEMP 27-36

	1	2
1	1118.	
2	1214.	
3	1018.	983.
4		1151.
5	1566.	1284.
COL.AVE.	1229.0	1139.5

CVERALL AVERAGE 1190.63 TMAX 1566. TMIN 983.

LINER CAN 4 TEMP 1-26

	1	2
1	1390.	1045.
2	1314.	
3		1377.
4	1707.	1427.
5		1323.
6		
7		1035.
8	1092.	1311.
9	1499.	1504.
10	1669.	1602.
11	1069.	
12	1135.	
13		1051.
COL.AVE.	1359.5	1297.3

CVERALL AVERAGE 1326.59 TMAX 1707. TMIN 1035.

Fig. 4.2

RDG 133,RPM 7110,T2-79.C,T5-1050,C.F.-3RD 10 HR,10-25-63

LINER CAN 4 TEMP 27-36

	1	2
1	1022.	906.
2	1034.	1032.
3	975.	1083.
4	929.	1081.
5		1173.
COL.AVE.	990.0	1055.0

OVERALL AVERAGE 1026.11   TMAX 1173.   TMIN 906.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1546.	1398.		1337.
2	1428.	1420.		1489.
3	1499.	1365.		
4	1589.			
5	1618.	1481.	1535.	1473.
6	1557.	1496.		1516.
7	1288.	1221.	1250.	1246.
8	1329.	1294.	1319.	1233.
9	1235.	1229.	1224.	
10		1142.	1187.	
11				1246.
12	1209.	1282.	862.	863.
13	966.	950.	733.	699.
COL.AVE.	1387.5	1298.1	1158.7	1233.8

OVERALL AVERAGE 1283.08   TMAX 1618.   TMIN 699.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1320.3	1222.6	1263.8

Fig. 4.2-47

RDG 146,RPM 7080,T2-76.0,T5-1052,D.F.-3RD 10 HR,10-25-63

LINER CAN 10 TEMP 1-26

	1	2
1	C	C
2	C	1211.
3	C	1310.
4	1744.	1470.
5	C	1527.
6	C	C
7	C	1232.
8	C	1533.
9	C	1729.
10	1546.	C
11	1295.	C
12	1631.	C
13	C	1379.
COL.AVE.	1554.4	1423.9

OVERALL AVERAGE 1467.41 TMAX 1744. TMIN 1211.

LINER CAN 10 TEMP 27-36

	1	2
1	1307.	
2	1227.	
3	1010.	964.
4		1127.
5	1356.	1190.
COL.AVE.	1225.2	1093.7

OVERALL AVERAGE 1168.84 TMAX 1356. TMIN 964.

LINER CAN 4 TEMP 1-26

	1	2
1	1426.	1047.
2	1332.	
3		1336.
4	1730.	1371.
5		1361.
6		
7		1095.
8	1017.	1284.
9	1487.	1495.
10	1628.	1524.
11	1063.	
12	1115.	
13		1053.
COL.AVE.	1349.8	1285.4

OVERALL AVERAGE 1315.68 TMAX 1730. TMIN 1017.

Fig 4 2-85

RDG 146,RPM 7080,T2-76.0,T5-1052,D.F.-3RD 10 HR,10-25-63

LINER CAN 4 TEMP 27-36

	1	2
1	1031.	911.
2	1029.	1029.
3	969.	1036.
4	915.	1080.
5		1213.
COL.AVE.	986.0	1053.7

OVERALL AVERAGE 1023.61 TMAX 1213. TMIN 911.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1613.	1439.		1314.
2	1406.	1509.		1453.
3	1475.	1360.		
4	1659.			
5	1667.	1465.	1513.	1559.
6	1777.	1477.		1524.
7	1427.	1222.	1186.	1230.
8	1250.	1310.	1414.	1194.
9	1226.	1199.	1212.	
10		1137.	1190.	
11				1243.
12	1188.	1252.	858.	846.
13	959.	953.	733.	699.
COL.AVE.	1422.6	1302.1	1158.1	1229.3

OVERALL AVERAGE 1293.23 TMAX 1777. TMIN 699.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1357.4	1214.6	1274.9

Figure 4.2-49

RDG 155,RPM 6856,T2-74.0,T5-920,D.F.-3RD 10 HR,10-25-63

LINER CAN 10 TEMP 1-26

	1	2
1	C	C
2	C	1052.
3	C	1085.
4	1433.	1465.
5	C	1311.
6	C	C
7	C	1140.
8	C	1358.
9	C	1751.
10	1604.	C
11	1277.	C
12	1574.	C
13	C	1401.
COL.AVE.	1472.2	1320.5

OVERALL AVERAGE 1371.10 TMAX 1751. TMIN 1052.

LINER CAN 10 TEMP 27-36

	1	2
1	1176.	
2	1192.	
3	975.	904.
4		882.
5	1022.	932.
COL.AVE.	1091.1	906.3

OVERALL AVERAGE 1011.94 TMAX 1192. TMIN 882.

LINER CAN 4 TEMP 1-26

	1	2
1	1310.	980.
2	1245.	
3		1246.
4	1615.	1416.
5		1266.
6		
7		1097.
8	1305.	1141.
9	1293.	1392.
10	1548.	1502.
11	958.	
12	1068.	
13		963.
COL.AVE.	1293.0	1222.5

OVERALL AVERAGE 1255.66 TMAX 1615. TMIN 958.

FIG. 8

RDG 155,RPM 6856,T2 [illegible]4.0,T5-920,D.F.-3RD 10 HR,10-25-63

LINER CAN 4 TEMP 27-36

	1	2
1	936.	835.
2	937.	944.
3	854.	941.
4	839.	984.
5		1092.
COL.AVE.	891.7	959.1

OVERALL AVERAGE 929.17 TMAX 1092. TMIN 835.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1355.	1265.		1188.
2	1240.	1316.		1281.
3	1374.	1264.		
4	1429.			
5	1386.	1308.	1333.	1325.
6	1339.	1298.		1399.
7	1170.	1082.	1043.	1183.
8	1048.	1186.	1189.	1088.
9	1074.	1050.	1128.	
10		1000.	1041.	
11				1086.
12	1096.	1082.	788.	772.
13	878.	873.	673.	645.
COL.AVE.	1217.4	1156.7	1028.0	1107.6

OVERALL AVERAGE 1138.92 TMAX 1429. TMIN 645.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1238.8	1142.6	1163.2

Fig. [illegible]

RDG 167,RPM 6850,T2-65.0,T5-919,C.R.=3RD 10 HR,10-25-63

LINER CAN 10 TEMP 1-26

	1	2
1	C	C
2	C	1071.
3	C	1109.
4	1573.	1477.
5	C	1361.
6	C	C
7	C	1149.
8	C	1361.
9	C	1749.
10	1520.	C
11	1226.	C
12	1495.	C
13	C	1240.
COL.AVE.	1453.3	1314.9

OVERALL AVERAGE 1361.02 TMAX 1749. TMIN 1071.

LINER CAN 10 TEMP 27-36

	1	2
1	1142.	
2	1078.	
3	959.	896.
4		895.
5	1012.	943.
COL.AVE.	1047.8	911.1

OVERALL AVERAGE 989.23 TMAX 1142. TMIN 895.

LINER CAN 4 TEMP 1-26

	1	2
1	1251.	955.
2	1185.	
3		1225.
4	1573.	1218.
5		1280.
6		
7		948.
8	797.	1163.
9	1362.	1397.
10	1606.	1473.
11	944.	
12	1060.	
13		959.
COL.AVE.	1222.3	1179.9

OVERALL AVERAGE 1199.88 TMAX 1606. TMIN 797.

RCG 167,RPM 6850,T2-6[illegible].0,T5-919,D.R.-3RD 10 HR,10-25-63

LINER CAN 4 TEMP 27-36

	1	2
1	941.	824.
2	928.	931.
3	851.	938.
4	836..	970.
5		1080.
COL.AVE.	889.1	948.6

OVERALL AVERAGE 922.13 TMAX 1080. TMIN 824.

DIAPHRAGM TEMPERATURES

	1	2	3	4
1	1385.	1272.		1184.
2	1252.	1205.		1319.
3	1379.	1264.		
4	1452.			
5	1389.	1316.	1352.	1261.
6	1410.	1357.		1409.
7	1242.	1084.	1144.	1103.
8	1065.	1167.	1239.	1073.
9	1079.	1108.	1080.	
10		1003.	1064.	
11				1130.
12	1064.	1097.	778.	774.
13	871.	865.	668.	632.
COL.AVE.	1235.2	1158.1	1046.2	1098.6

OVERALL AVERAGE 1145.73 TMAX 1452. TMIN 632.

TEMPERATURE AVERAGES

CAN 10 AVG	CAN 4 AVG	CAN 10+4 AVG
1224.0	1103.7	1154.5